Research Note 80-4

COGNITIVE MECHANISMS AND BEHAVIOURS INVOLVED IN OTHER THAN INSTITUTIONAL LEARNING AND USING PRINCIPLES OF DECISION

Gordon Pask

System Research, Ltd

EUROPEAN RESEARCH OFFICE
United States Army
London England

U. S. Army

Research Institute for the Behavioral and Social Sciences

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The research is continuing under Grant DAERO-79-G-0009 and the various system improvements noted as part of this report are in progress.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The report describes studies of individual and team decision making in complex command, control and communication systems involving man machine and computer regulated interaction. The most recent advance is a comprehensive team decision system able to exteriorise normally hidden conceptual operations as behavioural records. The system has training, testing and

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20. ABSTRACT (Cont'd)

operational applications. It incorporates an on line, novel concept, interrogation system, records for which (together with logging the condition of a space environment) provide indices of decision making style and performance which are compared with data from (also novel) tests for learning style. The system also incorporates a computer implemented planning and representation method as well as an environment in which the decision process is instituted by essential bifurcations. The method is a micro-behavioural conversation, based on conversation theory, from the conversation laboratory studies.

Summary analysed results of earlier parts of the research project are presented, but the recent research is exemplified by detailed records since work is continuing under Grant DAERO-79-G-0009. It should be possible to establish indices of decision style, performance and an index of individual and team behaviour under more or less stringent conditions, but the data is bulky and not easily analysed. Amongst the anticipated results are relations between learning and conceptual styles, team stability, the alternation of roles, predictions regarding performance quality and responsibility and, finally, the realistic prospect of a powerful decision aid to be used either regularly or as an optimal response device under circumstances when the participants have no opportunity to make thoughtful and wise decisions.

Cognitive Mechanisms and Behaviours Involved in Other Than Institutional Learning and Using Principles of Decision

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Contents:

Introduction

Over the two years of Grant DAERO 76-G-069 it has been possible to design and implement a system which embodies the exteriorisation many aspects of individual Team Decision Making in a complex command and control system. Amongst the objectives were attempts to determine individual decision style, to relate decision style to individual score profiles on existing tests for conceptual style, to examine the possibility of decision training in such a system and its application as a decision aid.

The research policy was deliberately oriented to the non trivial goal, of obtaining symbolic behavioural records of Individual Decision Making and of Team Decision Making, taken at its face value and without the hedges, that, all too commonly, plague research in this field; for example, the unrealistic, though convenient, assumption that there are really well specified alternatives, that "team" has a convenient but unrealistic interpretation, as some (not very well specified) aggregate of people; that decision is somehow related to "choice" and is (heaven knows why) an ubiquitous and easily exteriorised feature of behaviour or thinking.

The fact is that none of these assumptions have much usefulness or validity outside the laboratory, and the imperfections they engender become evident in complex command, control, and communication systems (or when findings from neatly contrived laboratory experiments are applied in the field).

On the other hand, it is by no means easy, either theoretically or technologically, to realise a system in which team decision making is genuinely exteriorised; the difficulties being exacerbated by accommodating the unavoidable, because realistic requirement that any team decision system has testing and training and operational features which can be exploited, and which it would be wasteful not to exploit. However, in terms of system design, there are awkward problems of recording, data logging, and the like.

The two years are chiefly dedicated to winnowing out situations that will not make the grade, and the main product, at this stage, is probably a team decision system in which reality is captured with only a few qualifications (and these are due to superable technical problems, stemming, chiefly, from limited resources). This team decision system is operational and a fair amount of data has been collected during the last few months.

The work statement for the grant includes a clause to the effect that the final scientific report (and some of the progress reports) take the form of a book. Since the scope of the research has been wider than originally anticipated, as well as being ongoing, it would be difficult to provide a complete manuscript, especially since the research is intimately related to a series of ARI sponsored decision conferences the last of which contains a lengthy position paper on precisely this subject, and until further experiments have been completed, this paper provides a substantially up-to-date account of what has been achieved. Rather than burden a report, which should give a historical and factual account of the work, with the many interesting philosophical and theoretical issues which have emerged from the research, it seemed wiser to place these theoretical discussions in a series of "Essays" on, for example, the formulation of "Conversation Theory"# (the framework of the research). On "the nature of autonomy, closure and information transfer inside and between decision systems". These essays are chapters in the promised book, to be augmented in production by the factual material contained in this report.

These essays are bound separately from the report.

What <u>is</u> decision and <u>where</u> does it take place. Facile answers to these questions (for example, "decision takes place <u>when</u> a response is selected <u>by</u> somebody who decides"), are both logically unsatisfactory and unsupported by the evidence available. As a conjecture, neither question has the kind of answer expected in an examination room. In a fundamental sense, there are no uniquely "correct answers" to these questions. An attempt to enlarge the scope within the usual framework of Behavioural Science is both on logical and on empirical grounds, likely to lead into an unproductive and possibly indefinite regression. For example; that decision manifestly involves learning; which involves thinking, which involves the personality, etc. (The situation is even more complex when teams, rather than people, are making decisions).

See also references cited in this report (Selected Bibliography) and in other papers.

If only to avoid this situation, the notions of decision employed in this research are laid upon different foundations; specifically, those of Conversation Theory. Other general system theories of thought and action may do much the same job. But I am familiar with this formulation, and, though it has theoretically complex foundations, it is no less generally intelligible than other candidate theories.

The essay on Conversation Theory is an account of those aspects of the theory that are specific to the concerns of this report and as brief a summary as possible of the general principles.

1. Overview and Outline of Position

Quite a lot of evidence was at hand when the project started. Most of it was culled from a series of conferences on Decision Making in Complex Systems and all of it was filtered or refined by discussion with the experts who participated. Some of these conferences emphasised the possibility of training decision makers or assessing the aptitude and capability of potential decision makers. Others had a wider brief; to scrutinise the operational or dynamic aspect of complex decision systems as they exist to specify criteria of performance and the like.

1.1. Some Empirical Points

It seems that people do not usually "choose amongst alternatives"; they "build a world view and consider actions in that framework". Decision is a complex of mental activities and behaviours; thinking and doing.# Learning is a necessary concommittant. Decision cannot be localised as an integral mental activity except perhaps, in game playing. Probably game playing is the most successful training situation in common use, but if we ask what the players learn, the answer appears to be "some valuable but task specific behaviours; some specific ploys, appropriate response sequences". They do not learn decision and do not seem to learn much about the organisations on which the simulated or genuine environment is based (for example, an economy).

I appreciate that some people dismiss any hope of tackling Team Decision Making as a totality. For example, one friend, a psychologist, regarded a holistic or "total system" approach as utterly daunting, alien to his way of thinking, and liable to be unproductive. He said (roughly), "If you want me to talk about decision in that (holistic) sense, then I have to talk about all psychology; I just cannot do that". I concur with all but the last clause; holding that we must talk about all psychology (a deal of social science, and computer science as well), if our observations are to deserve attention, and I can try to do so, (with success or not, is a different matter).

It turns out that a substantial proportion of the research upon complex team decision making, especially that part which is lengthy, microbehavioural, quantified and compared with individual performance, has been carried out at this laboratory, under the support of either the US Army or the US Air Force (some, later, work on Decision Making by Detective Inspectors, the SIMPOL system, by the UK Home Office). Until searching the literature I did not realise how much work was recorded in our archives (and, presumably, also, in yours). There is a summary paper in the psychological literature, Lewis, B N and Pask, G. "The Self Organisation of a 3 Person Task Oriented Group" pp 291-321 in The Simulation of Human Behaviour, NATO Conference of 1967 in Paris published (Ed De Bresson, F and Montmollin, M) No 7 Sciences due Comportement; Dunod, 1969, Paris and there are several cybernetic and system theoretic papers. None of them, however, provide the detail accessible in the following Final Technical Reports on "A Study of Group Decision Making and Communication Patterns under Conditions of Stress and Overload"; namely, Contract DA-91-591-EUC-2753; Jan 1963 to Dec 1963. Contract DA-91-591-EUC-3216, Jan 1964 to Dec 1964, and Contract DA-91-591-EUC-3607, Jan 1965 to Dec 1965, together with the USAF Scientific Reports on "Adaptive Teaching Machines", (in fact, regulated group systems), TR No 1 April 1961 Contract AF61(052)402 and Final Scientific Reports 1960-1965 Contract AF61(052)402 March 1965.

Apart from the general finding, that teams engaged in complex interception, classification and problem solving are "Self Organising" (in Von Foerster's 1961 sense and Nicolis' 1975 sense), these meanings of "Self Organisation" are differently derived but identical though independent) the Reports tell, in their own terms, much the same detailed stories (of participation, of communication, stylistic difference, etc) which it is now possible to detect in the current computer regulated team decision system using more reliable and sophisticated controllers and monitors.

In large measure, these findings were obtained because (unlike other laboratories at that period) we used extremely elaborate special purpose hardware for regulating and monitoring human behaviour, various adaptive measurement techniques, etc, before computers were often employed for this purpose. As a result, it was possible to examine the microdynamics of human behaviour and to do so in a period when "atomistic" or "simplest" paradigm experiments were even more thoroughly in fashion than they are today.

The experience gained is also, to some extent, a justification for the otherwise slightly offhand rejection of experimental situations as "inadequate" for exteriorising a decision process; an "inadequacy" debated in Section 2 of this report.

The work that has been carried out in other laboratories, indicates the strong and dominant effect of interpersonal perception, even if the roles of team members are strictly specified, and even if communication is limited to non verbal channels. This is not so much a matter of contemplating the personality of the others (though that enters into the picture), but of anticipating the hypotheses they are likely to entertain, whether they are prone to take risks and how they react to stress. It also seems that the competition/cooperation dichotomy has scarcely any bearing upon team operations. Team members cooperate if they are in a tight corner; if they are not, then they may or may not compete, but often do so. Under these circumstances, the elegant abstraction of a payoff matrix is virtually meaningless and cooperation/competition oscillate, depending upon circumstances.

At the level of strategy, the same comment applies to the relation between a team (or its members) and an antagonist or opponent. At a tactical level, it is true, the antagonist becomes an "indivisible" enemy; collusion and bargaining are impossible. There are no enemy factions. But this is an unrealistically restrictive view of things; even if the command structure ordains a very definite polarisation, it would be naive to assume that the ordinance accurately reflects the thought of a participant (or, at the level, in the echelon of responsibility where strategy making or miniature policy making is permissible, the sustained action of a command team). Quite evidently, in practice, this level can be reached by any human being, in any position warranting human decision.

Conversely, it is true of all but a few, specially isolated, roles that people who operate at even the highest strategic level may be forced, by adversity, into a tactical mode where the enemy is psychologically unequivocal and unique.

For example, a general may act, for the most part, strategically; in difficulties, he is responsible (actually, as well as by mandate) for tactics. In contrast, the platoon commander must often do more than obey orders. Though primarily assigned the role of tactician/executive, he acts the strategist/tactician when facing a guerilla organisation and an ambivalent populace. So does the isolated infantryman, or the astute intelligence agent.

Right at the other extreme, in the centre of a command, control, and communication network, the multifarious character of decision is only reduced as part of an illusion (fostered, it is true, by taking game theory, game matrices and all the simulations and sophistications that go with them, for granted; as the way to deal with reality). I cite, in published witness to this fact, (and supposing that naval commanders are more thoroughly placed at the centre of a network than the commanders of industry, or the army) an article, by Admiral G E R Kinnear (1976) on "C^3 at sea".#

1.2. Critique of an Oversimplified View

The point of view, which is implicitly criticised as "too simplistic", is a "context free" view. Its protagonists do not do justice to decision as a systemic phenomenon; as something involving action in context, both concrete, and psychological.

For example, if I know that A is a gambler, that A wishes to achieve a certain objective in the gaming room and is not in collusion with some other person, B; that A and I entertain comparable preconceptions about the dice (including, perhaps, the possibility that they are biassed, or that their bias changes, or that their bias is changed by some other sentient being), then it is entirely possible to offer A sensible advice and discuss the recommended action.

Such recommendations can be elaborate, depending upon A's objectives (to maximise gain for a given stake or over a fixed number of plays). The advice is a game theoretic "strategy" (not a strategy in the sense of the previous discussion). It may be a contingent plan of action (for example, contingent upon discovery of a bias or the amount of money in hand). In electing to adopt the recommended plan (and, henceforward, I shall use this word in place of "game theoretic strategy" to avoid confusion), A may be said to *decide*. Quite possibly the

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Kinnear, G E R (1976) C^3 at Sea. In Procs. Workshop on Decision Information for Tactical Commanders, published by Robert M Thrall and Assocs, Houston, Texas.

recommendation is to bet upon one throw of the dice, in which case A decides to do that. A could also decide to adopt his own plan of action (including action, namely systematic enquiry, intended to elicit information about bias or whatever). A might even decide to change his own plan at every turn.

But, in the context of a gambling room where occasions for throwing are ordained by a rule and clock, or by a functionary, it is usually curious, if not downright absurd, to say "A decided to throw"; at any rate, if we do say that, then we may just as well say "A decides to make each step he makes in walking across the room".

Yet mainstream psychology seems to assert "A decides to throw", in situations not unlike a disjunctive reaction time experiment, perhaps elaborated by "predicting the next button to press with known payoffs". The philosophy behind these studies (when it is thought about at all and occasionally, it is examined) contains, I submit, a colossal blunder destined to open up false and not sensibly answerable questions. For example, under the circumstances I have parodied, the apparently reasonable question "How good a decision maker is A?", boils down to "how good an automaton is A?". That can be determined fairly straightforwardly by measures, of accuracy, and speed of operation, for example. But, if this answer is rejected (and, in an ordinary usage of decision making it should be), then there is no answer within the stipulated framework.

The point under criticism is not the grain, the size of action, that elicits decision or, even, when decisions are made. It has been conceded that A can decide upon a one move plan, and change plan at each move. By the same token, A can decide at each step, when walking (but he is only likely to do so if he stubs his toe). A might also decide to hurl the entire choice set-up across the room, if a lunatic gunman entered the gambling parlour, by way of self protection (there are alternatives, he might otherwise, have decided to duck, or place the croupier between himself and the gunman, or just to carry on playing with creditable nonchalence). The point at issue is systemic, or contextual, relevance. In the context of gaming, most of A's dice throws do not signify relevant decisions; the gunman decision is relevant to an entirely different context, the selections made in a dressed-up disjunctive reaction-time experiment are scarcely ever decisions made by A about the alleged situation. I well recall discussing the matter with Richard Gregory, when he acted as subject in Hick's original experiments; and served as subject matter in

similar situations. Clearly we were not deciding about our selections except in the improper jargon of computer programming where structures like

are loosely termed branches in a "decision tree" (as though the machine "decided" at any test point). In this case, where the matter of selection was properly considered, it was possible to obey the (non deliberative) experimental instructions.

Or, take a different context, the behaviour of a committee, acting as part of an organisation with many committees.

Do the members really decide? Surely, they cast votes, say "aye" and "no"; does that signify decision making by the members? I suspect, and Atkin has some beautiful quantitative data to support the suspicion (which he, also, entertained) that usually they do not decide about the issue under debate. Usually, the issue is determined when they ruminate and vote. People may well have decided to act as good committee members, their muttering and voting is a behaviour which signifies this quite different decision. The particulars of voting are rarely decisions; (they are, perhaps, just releaser determined behaviours).

Atkin calls the flux of psuedo-decisive activity, observable under these circumstances "organisational-noise", insofar as it is relevant to the issue under debate, and is likely to block up the organisation.

Most of the gamblers' activity, or my activity as a subject, is "noise" in the same sense. Though the selective behaviour may (or may not) arise from a genuine decision to act as a good gambler or subject, it is not to be construed as signifying the decisions that A or I make in a context which depends upon an agreement to gamble or an agreement to press buttons. If any decision is signified by the selection then (with the real exceptions conceded) the decisive agent is not A, as ordinarily described.

1.3. The Outline of a Model

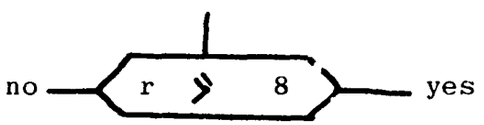
Suppose we could identify A in some appropriate, functional, manner (I intend to adopt a sceptical

attitude towards the accepted means, for doing so; by head counting, for example, in the sequel. But, for the purpose of argument, suppose we can functionally identify A). Under what circumstances, and in which contexts or systems is it reasonable to say that "A decides" about matters germane to one context or the other?

Specifically, let there be a collection of dynamical systems, $S_1 \ldots S_M$, such that, at any instant $n = 0, 1, \ldots$, A and A's behaviour is a subsystem of one or more of a subset of these dynamical systems, say, at instant n, of m_n of them $S_i \ldots S_j$, with i, j, = 1, 2, ... M, with $M \gg m_n$.

This subset of m_n dynamical systems contains A and A's behaviour at any instant (perhaps a different subset at the next instant). Let the process going on in any S_i (for any value of i), be represented (literally described), by certain equations in canonical variables (a "state space" or "phase space"). These equations (descriptively) determine S_i, and thus A. It does not matter, at this juncture, what these equations may be but the integrity, in a fundamental sense the stability of S_i hinges upon some such equations being satisfied (though how is irrelevant).

Now the process described by these equations may accommodate all manner of plans and test boxes like



which surely do not require decisions; for the stability of S_i (containing A), is completely assured by the process and the control and data transfer it mediates, ie. the process described by the equations for S_i.

As noted in Essays 1 and 2, the "fundamental" stability criterion is the autonomy or "organisational closure" of the system S_i, which could, for example, be A, the gambler, in the context of his gambling saloon (even though this particular set up is not very often discussed in these terms).

The criterion does not preclude the possibility that S_i is also "informationally open", as well as "organisationally closed". Essay 1 and 2, information transfer can take place between S_i and some other system; the word "information" being used in its most "general"

sense, ie. "information transfer" implies either that two (or more) a priori independent systems become dependent, or that two (or more) a priori asynchronous systems become locally synchronised, or both. In fact, if there are lunatic gunmen around the gambling hall, S_i had better be informationally open, unless its autonomy (and stability) is to disappear for each intrusion.

If attention is focussed upon the equations that describe the process of S_i, then the matter may be rephrased in terms of singularities or bifurcations in these equations, ie. points at which information must be introduced (though the equations do not say how), in order to determine a stable trajectory.

If an information transfer is able to maintain autonomy (alias, stability) within the coordination of the canonical variables proper to (determined by, and partially determining S_i) then the bifurcation is inessential; if the transfer must lead to a change in the coordinate scheme it is essential. Notice that, in this case, S_i (containing A) also changes into some other S_j (containing A) and the subset of m_n dynamical systems in which A participates will be modified to maintain overall stability.

From the descriptive point of view, the occasions for information transfer are indicated by singularities in (or bifurcations determined by) the descriptive equations satisfied by the process that, for example, is S_i.

Consequently, it is possible to enunciate a stability requirement for systems with bifurcation; namely, that information transfer may take place and must take place insofar as it is needed to maintain the stability of the S_i (without precluding the possibility that it can also take place, otherwise).

One connotation of decision is "an event accompanying information transfer", or that "A decides in S_i" when this event does take place. This picture fits the interpretation of S_i as "A and the gambling hall" when the bifurcations are inessential (apart from the lunatic gunman) and are due to circumstances unforeseen in A's plan (not, usually, by dice throws). The picture also fits a much larger class of situations of which I intend to concentrate upon "Missions".

1.4. The Idea of a Mission

A mission may be civil or military. For example, to maintain the Liberal party as a middle of the road forum, in British politics; to maintain Honeywell as a viable corporation; to keep the Aba Daba Music Hall running in London; to protect trade; to maintain territory.

Let us list a set of disjuncts of conjunctions of subsystems containing A, called $\mathcal{R}$ like,

S_i and S_j
or S_i and S_k and S
or S_j and S_k and S

that are necessary to a mission. In the gambling hall case (which is a trivial mission) there is only one term S_i, in the list; hence, no essential bifurcation can take place; the lunatic gunman transforms S_i into S_j. Most realistic missions are less restrictive.

To accomplish the mission sufficient conjuncts of systems (in the disjunctive list, $\mathcal{R}$) must be stable for all instants n.

Notice that the members of $\mathcal{R}$ are dynamical systems, consequently, the mission is a process. Its achievement depends upon maintaining the stability of sufficient S_i to satisfy $\mathcal{R}$ over all instants, n, with (as before) A contained in each of the S_i, as a subsystem.

An obvious criterion of A's quality as a decision maker is the extent to which A, as a subsystem of any of the S_i, can reduce the information transfer needed to stabilise the S_i in $\mathcal{R}$; that is the extent to which, by dint of ingenious planning, A does not have to make $\mathcal{R}$ - relevant decisions (information transfers involving his S_i in $\mathcal{R}$), though, however ingenious and knowledgeable A may be, it will, in an aleatory universe, be essential to make some $\mathcal{R}$ - relevant decisions.

1.5. Different but Complementary Meanings of "Decision Making"

(a) Choice

One connotation of decision has already been spelled out, implicitly, at least. Decision is the information transfer that must take place in a dynamic system (which has to do something) when its descriptive equations have a bifurcation which generates a distinction which we (as well as the decision maker) can recognise. This kind of decision will be called a choice; and, notice, that a

computer which is programmed has no choice (either the value of r in the test box is given, or the machine appeals to a "random" number table or a "random" generator, or it halts until an r-value is input).

In contrast, A does exercise choice, and A's quality as a decision maker, in this sense, is the extent to which he, as a subsystem of the S_i, reduces the incidence of choice engendered by bifurcations in the S_i of $\mathcal{R}$; literally, the extent to which A reduces the amount of choosing he does, (puts himself out of a job).

(b) General Decision

Another connotation of decision, which is also countenanced, is "all of mental activity" (however much my psychological friend may dislike the idea). As a matter of fact, it must be countenanced, since in whatever particular idiom A is (functionally) specified, as a process, there must be an information transfer going on continually within A. In psychological terms, information transfer is a concommittant of awareness; in abstract terms, the internal transfer is needed to preserve A as an organisationally closed and informationally open system.

Since the information transfer needed to obtain coherence across the distinction induced by an essential bifurcation is counted as Decision Making (and called "Choice") the ongoing information transfer needed to maintain A as a coherent entity is also a variety of Decision; say "General Decision".

It is important to notice that the information transfer is, in both cases, "fundamental". The data transfer and control signals (the "test box" operation) that takes place in A is not the "ongoing information transfer"; literally, A depends upon an activity which promotes coherence or local synchronicity as well as a process that gives rise to divergence and the manufacture of distinctions; one is contingent upon the other. In psychological terms, this is an assertion that A continually learns, thinks and reconstructs memory; further, that A is aware of the process. The existence of such a process is expressed, formally, by the activity postulates of Essay 1 and Essay 2.

This is "general decision" or "decision making in a broader sense than choice". All decision gives rise to action; it happens that these decisions often produce indirectly observable intellectual action, rather than overt behaviour.

Surely only some of A's learning and A's thinking is relevant to $\mathcal{R}$ (that is, A is a subsystem of systems that are not indexed in the list $\mathcal{R}$). But some thoughts, those involved in the creation and discovery of planning, for example, are relevant to $\mathcal{R}$. Thus, insofar as we are anxious to forecast or prejudge A's quality as a decision maker, rather than to assess A's performance, there is an auxilliary criterion, that is, the extent to which A can exteriorise and render communicable the information transfer, directly or indirectly relevant to $\mathcal{R}$, which will, in the sequel, be identified with the creative or inventive progenitor of planning (literally, building a representation from which plans may be derived).

1.6. Other Considerations

Ultimately, the finite set of dynamic subsystems S_i --- S_M, is a descriptive artifact; for, even though the components of the S_i often designate concrete and aleatory components, the S_i are generated by A, regarded, functionally, as a process. Further, A will engage in "our" mission just insofar as "we" can establish some intersection between "our" $\mathcal{R}$ and "his" m_n systems S_i. Since the S_i are dynamical systems (in fact, those distinguished by A, qua process) the intersection is not set theoretic but represents a coherence or agreement and the communication of the mission (and A's agreement to engage in it) depends upon exteriorisation in the first place.

In conversation theoretic terms this is a shared-conversational (or consensual) domain.

1.7. Decision is a Systemic Property

Nobody denies the essential bifurcations that arise from causes that exist in the environment; two things cannot take place at once, and I cannot lift both my legs at once (without falling flat on the floor).

The account given seems to say that all bifurcations are caused by mental events. This is an intended and deliberate exaggeration since these (mental) bifurcations are often underestimated, as subsidiary to "choice amongst alternatives", or the like.

The facts are (a) That "decision" is really a system characteristic, the entire system of the Decision Maker, his minions, machines, environment, and all (b) That bifurcations occur at any point (they are distributed over the system).

In some cases (which have been emphasised) the bifurcation amounts to a change of perspective which can be, rather spuriously, localised in one person or one team member or an act of consensus; as though the person or team is more realistically isolated from the machine aids, the environment, etc than are other components of the system. In other cases there are bifurcations, appearing as a choice between alternatives, (you cannot turn right and left at once!), as though these would have any meaning if they were isolated, artificially, from the rest of the system in which they are perceived as alternative-like.

1.8. Extension to a Decision Team

Technicalities apart, it is not difficult to extend the model for individual decision making to decision making by a team of people, designated as A, B, ... with a conversational domain (or a consensual domain) that overlaps in a mission (the sets of shared S_i expressions delineating the mission).

However, in the last resort A and B are characterised functionally, or organisationally, as processes. Some interesting questions arise because of that. For example, are the organisations or processes A and B really independent as units, are they a jointly autonomous unit, or are they both!

An important and relevant point is made in a commentary, by Reichenbach upon Lewin's principle of "Genidentity" (A now is the "same" as A later and B now is the "same" as B later, but A is not B), "Genidentity" need not be accepted and, insofar as the term "team" has real meaning it cannot be (though A, B, and A B, can all be credited with some autonomy). The evidence so far obtained strongly indicates that team integrity in complex command and control is maintained by the coupled activities of A B, jointly. At least under conditions of stress and overload, the team process "A,B" is the main autonomous unit. Lewin's principle (of Genidentity) is thus seriously questioned.

This amounts to restating the contention of the earlier research, for which reports are cited in the present text; namely, that a team acts as a "self organising" system so, also, do individual decision makers ("Cybernetic Models for Learning" Final Scientific Report of Contract F61 052-67-C-0-0010 June 1-69). In either case the "self organising" system is distributed over the people/person and his/their environment. Using Conversation Theory (which has developed against this background, but is a considerable advance upon it) the decisions can be identified as "bifurcations" in the descriptive dynamics of this (distributed) system.

2. Preliminary Research

The systemic view of team decision making outlined in Section 1 was partly formed before the project started; it matured greatly during the earlier studies, and became articulated during the second year. Consequently, the first year of the research was, for the most part, exploratory; only in the second year was it possible to specify and implement the least elaborate situation in which team decision making could be satisfactorily exteriorised.

The following account of the first year or eighteen months' research, is of chiefly historical interest. The empirical findings, with one exception, confirm findings obtained by others, in a different context. The early attempts to provide a laboratory setting in which even one person could exteriorise decision making, in an other-than-trivial sense, are informative "failures".

It can be argued, of course, that these attempts need not have been called "failures" (and thus written off or absorbed into a larger situation). Had experimentation persisted, it is quite likely that interesting and relevant behaviours would have been uncovered. The course of the work hinged upon the research policy of Section 1; namely, to aim for a situation in which the essential properties of team decision making can be accommodated, observed, and quantified (hopefully, a minimal system for this purpose). Situations, games, etc, were discarded. or altered if there seemed any good reason why these situations, games, etc, could not efficiently satisfy the full requirement, and modifications took place as soon as this became apparent, which, in most cases, it rapidly did.

The resulting pattern of research is thus slightly unconventional. The reasons for rejection of any candidate situation, are clearly stated in the following pages and are not claimed to be absolute, ie. "rejected" situations may prove productive in other hands, or a different setting. Regardless of whether the reasons for rejection are deemed sufficient, they indicate potential pitfalls which other researchers can usefully keep in mind.

2.1. Examination of "Military" Team Decision Systems

At the outset, in an attempt to capture realism, observations were made of subjects playing military games

and war games. These (if not structurally trivial, and without the opportunity for considerable pre-training), call for a fair interest in and background knowledge of, military affairs; occasionally, of special terminology though this is far less important than a certain orientation and habit of thinking.

Since officers were not available as subjects, this attempt would have been dammed at the outset except for the existence of a substantial war gaming fraternity, to which direct access was open through Mr Watts, who is a creditable military historian. For that reason, there was a real possibility of using members of this "fraternity" as a convenient subject pool. Plays of various (Appendix 1) games were observed carefully, and in different locations. The people who play these games, as a serious hobby, come from different walks of life, are of different ages and dispositions, so that the "pool" itself appeared to be heterogenous, and, on these grounds, representative of an intelligent population. Nor is it difficult to implement relevant parts of these games, exercises, and simulations, as computer programs; in fact, many of the games are already programmed for scoring and manoeuvring.

Apart from quite extensive observation, a miniature attitude survey was undertaken, by interviewing 12 respondents. The interviews were revealing and supported, after the event, by verbal and behavioural observation of play. Many subjects in the potential "pool" are "enthusiasts" in a very strong sense (like chess enthusiasts, for example). They are devoted to the occupation; without intending any perjorative connotation, almost "obsessed" by it. The exercise or simulation is regarded either (a) as a particular kind of puzzle solving task, or (b) as a historical recapitulation of battles (but battles in the abstract, as they are written up in books on military history).#

The interviews deliberately excluded persons (they obviously exist in such a population) who play to express some extreme political dogma in which they believe.

Not too surprisingly, in view of these comments, ability is game specific; the scenario, and the game rules adopted, impose a bias in favour of one or other type of subject or player. Some military games are designed to do so, which is a point in favour of suitably chosen game-like exercises as training-instruments, and it should be possible to garner a great deal of information about team decision, in general, over a series selected to emphasise different skills.

However, observation of a series would be a lengthy undertaking because of the pace at which the moves are made and conceptual operations are carried out. Although there are periods of excitement, when events are fast moving, the pace is usually, quite leisurely. Involvement and interest is maintained even though the rate of play is slow, because of enthusiasm for, or dedication to, the pursuit.

It is noteworthy that much the same comments about place and involvement apply to economic games and simulations, as used, for example, in business schools.

Although military games were the most promising candidate team-decision-situations, they were discounted in terms of pace and specialisation.

2.2. Experiments with Computer Programmed Systems

There are plenty of game-like but faster moving tasks, rooted in existing computer programs. As they stand, these tasks are fairly trivial; they are designed for amusement and facility in running upon small machines with modest display and response capabilities. But the procedural rules are simple enough to master within 15 minutes or so (though skill in using them is refined with practice), and they are certainly engrossing. These games are clearly useable by unspecialised subjects.

Essentially, these are "games against (aggressive) nature". Although they can be differentially scored, they are not "team games" in the ordinary sense. Until stated to the contrary, all "games" are "games against nature".

N Green adapted several BASIC programs of this kind for use on the laboratory LSI machine and logged performance over the most encouraging; a game, based upon the popular television series, "Startrek", and using the vocabulary of the series. Several modified versions, were introduced in collaboration with T R McKinnon Wood and B C E Scott.

The finally implemented team decision task (which bears almost no relation to the original "Startrek" theme), retains some of the terminology; the names, "Starbase" and "Klingon", and it is important, when comparing the different version, to realise that the names stand for quite different entities having, at most, generic resemblance. For example, in each case, "Spacecraft" are moveable, whereas "Starbases" are fixed. "Klingon" is the generic name for "Marauder". But, in each variant (most notably in the currently implemented task), the entities designated have very different control characteristics, properties, and operations attached to them, and their appearance in the system, is governed by an altogether different set of rules.

The names have been preserved because they are (it seems) culturally accepted. Apart from their allusion to generic categories, like "marauder", the entities, so named, are not assigned special significance until subjects have experienced the system in which they exist. The "space" scenario remains experimentally attractive just because "space" is seen as exciting but inherently mysterious; it is a strange environment in which subjects are willing to entertain hypotheses which are outside the range of stereotyped assumptions about systems of command, control and communication. To do so is deemed socially acceptable, so that latent hypotheses are not covered up by a conventional facade. An hypothesis that works is accepted as possible, rather than downright silly.

2.2.1. First Version

The BASIC listing for an intermediary game is given in Appendix 2. The player, or subject, faces a scroll up TV display, representing a 3 x 3 sector of "space", viewed from his vehicle, a "Starship". Using various weapons, the subject aims to eliminate "Klingons" from space (either 16 x 16 or 8 x 8 sectors in all). "Klingons", or destructive marauders, are generated by random number calls. Apart from "Klingons" and "Starships", space contains "Starbases" that are "friendly" and a randomly selected distribution of impenetrable obstacles, called Stars. The commands, through which the player drives his Starship, obtains information, and so on, are shown in Table 1, which is self explanatory if read as part of the following comments, extracted from a progress report, which indicate what was expected from observation and logging of game playing behaviour.

To quote ....

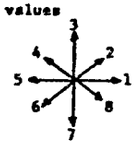
Command	Function
0	Warp drive for moving starship. Direction is specified using a circular vector notation. Real values may be used, eg. 1.5, 4.2 etc. Distance is specified in "warp factors". 1 warp factor is the distance between quadrant boundaries. Again real values may be used, eg. 1.2, 0.6 and so on. 
1	Long range scan. Scans over 3 x 3 quadrants. The current quadrant is in the centre. The scan shows the number of Klingons (K), Starbases (B) and Stars (S) in each quadrant
2	Phasers. A weapon for killing Klingons which permeates the surrounding space with destructive energy. Useful since the energy is not blocked by stars and one phaser "blast" may be used to kill several Klingons. Each Klingon has a shield energy of 200 units which is depleted each time it is hit by phasers. The energy hitting a Klingon is a function of energy discharged, distance and no. of Klingons. $\text{Energy of hit} = \frac{\text{energy discharged}}{\text{no. of Klingons} \times \text{distance}}$
3	Photon torpedoes. A weapon for killing Klingons. Each starship has an initial stock of 15 torpedoes. Torpedoes are missiles that are aimed. They cannot pass through stars. One torpedo can kill just one Klingon. Direction is specified using the same circular vector as used when moving by warp drive (command 0). Direction can be estimated visually. Alternatively, the starship computer will list the directions of all Klingons in the current quadrant (command 5, option 1).
4	Shield Energy. The shields of the starship protect it from hits made by Klingons. Klingons attack, using phaser energy; the amount of energy discharged is equal to their shield energy (initially, 200 units). $\text{Intensity of bit} = \frac{\text{energy discharged}}{\text{distance}}$ Travelling with shields up causes energy losses. When arrived in a quadrant containing Klingons, the player has an immediate opportunity to raise his shields before an enemy attack occurs. Each hit of the enemy depletes shield energy. If shield energy drops below zero, the starship is destroyed.
5	Library computer. This command gives access to the starship's computer. Three options are available : 0 : damage report. The starship may be damaged when warped at high speeds. The report says what damage has occurred and how long, in terms of moves, the repair will take. Damages are automatically repaired when the starship is docked at a starbase. 1 : computes the direction of all Klingons in the current quadrant. 2 : short range scan: shows the distribution of stars, starships, starbases and Klingons in the current quadrant.
6	Resignation. This command allows the player to end the game prematurely.

Table 1. Commands Forms used in the original Spacewar Game

"The game has several features which are of interest in the context of "decision formulation", and "decision making". These are :

(i) There is a "time"limit on the game. The player has 30 "stardates" in which to seek out and destroy the enemy. If at the end of 30 stardates there are still Klingons in the galaxy, the player has failed in his mission. Stardates are incremented each time the starship makes a manoeuvre (by warp drive, command Ø) which crosses one or more quadrant boundaries.

(ii) The need not to exhaust energy and weapons. Energy and weapons may be replenished by visiting starbases.

(iii) The tactical choice of which weapons to use when faced with a particular configuration of one or more enemy spacecraft and stars (two weapons are available: (a) torpedoes which are aimed and cannot pass through stars, and (b) phasers, which fill the surrounding area with destructive energy which does pass through stars.)The amount of energy required increases as a function of the distance from the enemy craft.

(iv) The need to avoid damage from enemy fire by having the starship's shield energized.

(v) A very general problem is that of searching through the galaxy to locate enemy spacecraft and "friendly" starbases, given that the "long range scans" gives a view of only a 3 x 3 segment of the 8 x 8 galaxy and given the need not to use up stardates by unnecessary"manoeuvres".

2.2.2.Behaviour Exhibited

To what extent did these "interesting features of the situation "uncover" interesting behaviours", that is, in the present context, behaviours related to decision making? The answer to this question is that behaviourly very little of real interest was manifest.

It is certainly true that some subjects (players) made decisions of a non trivial kind and several differences in style became evident, in protocols. But the situation fails to exteriorise the descriptions, plans, strategies, etc, in terms of quantifiable aspects of performance.

The main observations are as follows :

(a) Some subjects let their vehicle drift around the "galactic" space and dealt with "Klingons" when they were encountered. Of these, a few are simply "toying with" the situation and are not considered further; the rest, however, are persistent and have learned "drifting" as a viable mode of operation. Other subjects adopt a systemic search procedure.

(b) Attention is directed, from time to time, between detailed manoeuvring and weapon utilisation and more global activity (moving from sector to sector, sensing the distribution of "Klingons", or "Stars", etc). This feature is exhibited, neatly, by recording response latencies which have a generally bimodal distribution, (Fig 1).

(c) There is a training, or adaptation effect, so that most subjects become increasingly proficient at the skills required. This effect is conveniently recorded by latency distributions after trial runs and after some hour or more of experience, (Fig 2).

In fact, a cluster of specific response skills are really being acquired; for example, competence in manoeuvring and firing torpedos and (right at the outset, only), skills as basic as dealing with the display and response configuration. These comments tally with research on sequential choice and the elicitation of confidence estimates, where unfamiliar response habits are needed in order to indicate a degree of belief (or whatever; confidence, value).

It is true that manoeuvring a vehicle or directing a torpedo could count as "tactics", and it is undoubtedly true that skills of this kind are essential to good quality performance. However, insofar as there is evidence that the (putative; tactics are soon overlearned and performed automatically the acquisition of these skills has real, but only peripheral, relevance to "decision making".

To emphasise this point, the same kind of exteriorisable picture can be seen in records from a complex tracking skill (re-analysis of records from adaptively compensated interception and classification experiments, carried out for the US Army and the AFOSR during the early 196os, shown in Fig 2 and Fig 3). To emphasise the ubiquity of such behavioural adaptation, Fig 4 shows aggregate digital magnetic tape records from a microprocessor-based gaming-machine (the "Canyon Bomber") installed in a public house. The "Canyon Bomber" game is distributed by Casino Supplies Ltd. It is an odd use of words to call either tracking or play

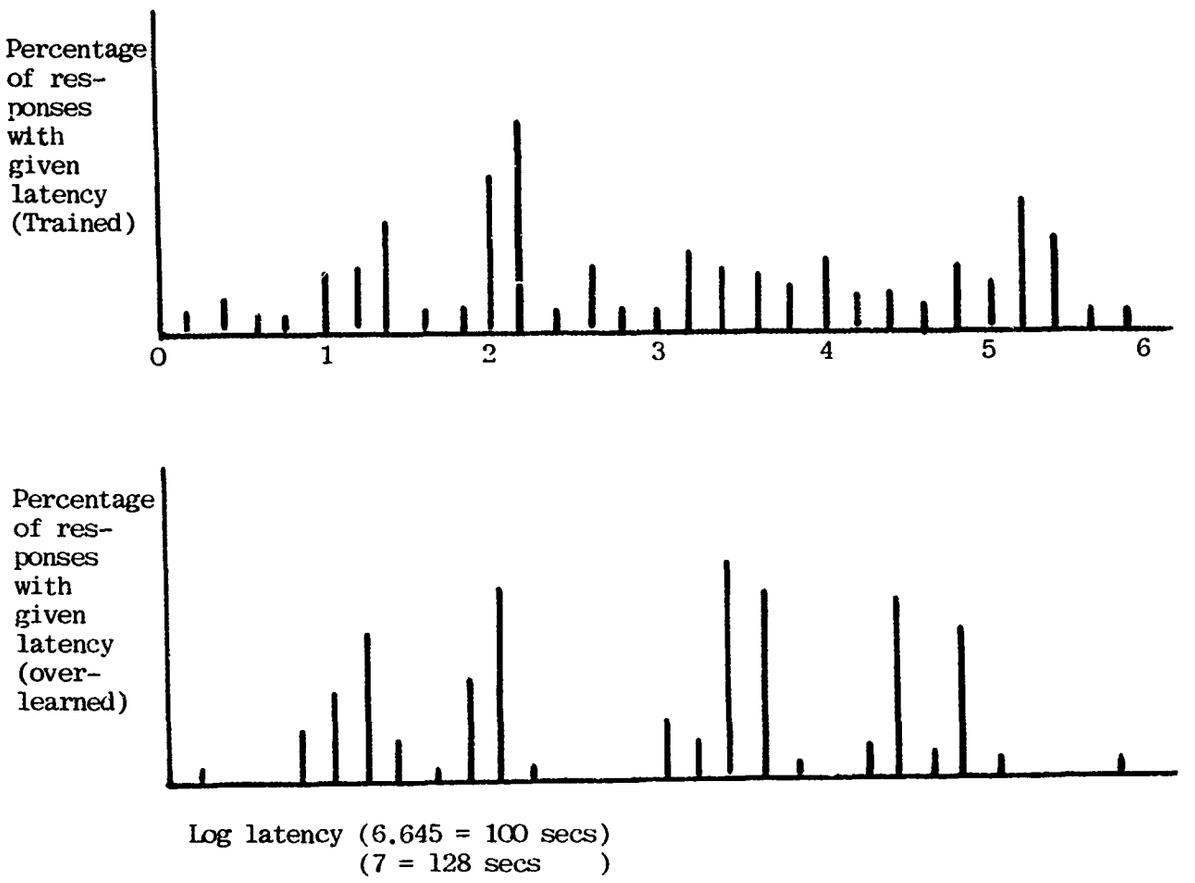


Fig 1 Response latency (between moves) collected over block half an hour after the outset of play (subject trained) and over block about two hours later, at point when the several component skills are fully learned. After two hours there is little change in the distribution Data is grouped over the subjects used in the course of the experiments.

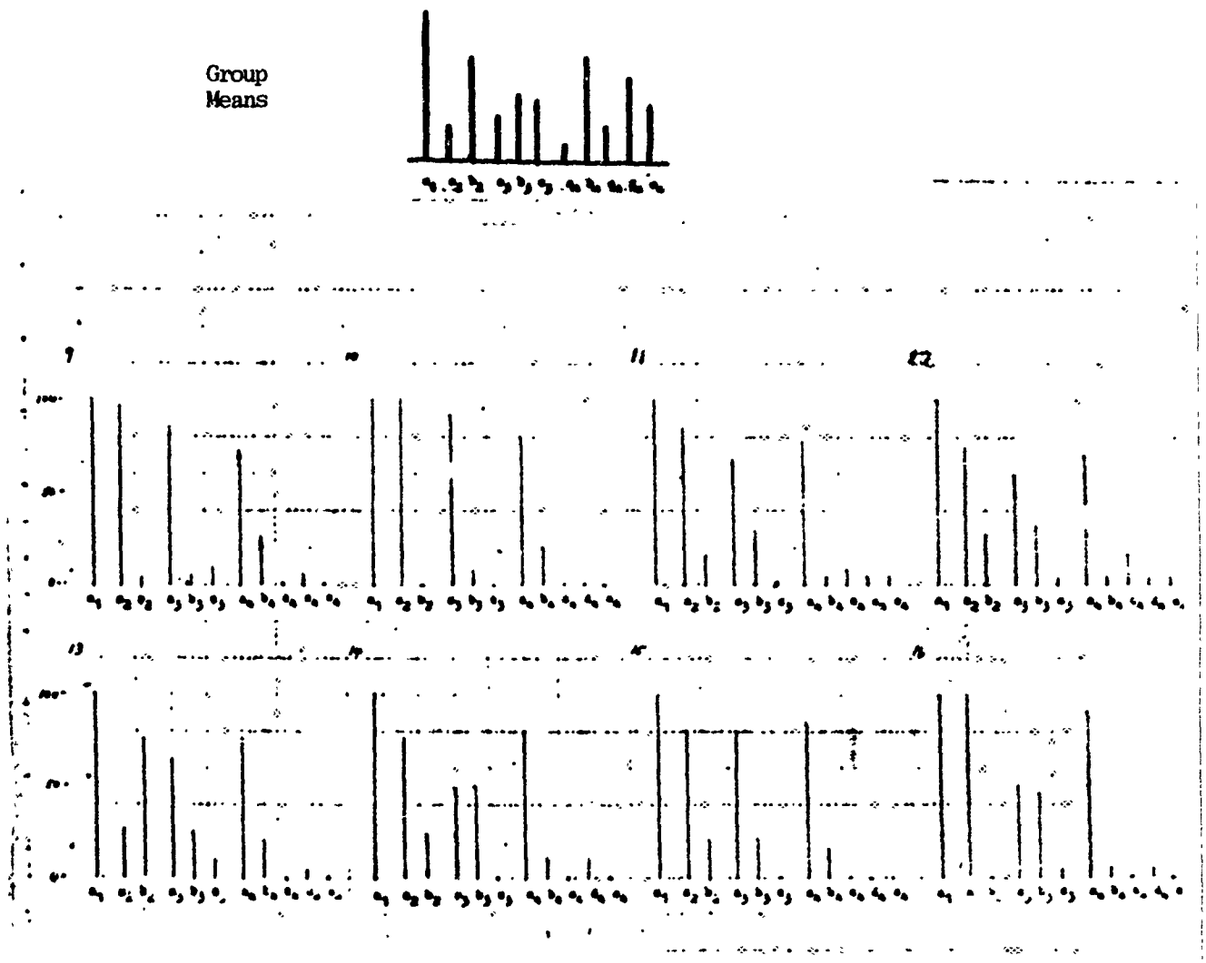


Fig 2: Periodic response latencies for 8 subjects and mean over all of 32 subjects from complex choice task used in early experiments on learning and decision making. The scale is linear, in this case, as some responses must occur within a fixed maximum interval. Details of all experiments are noted in the original report (including the data transformations that are used in the comparison of conditions and individuals)

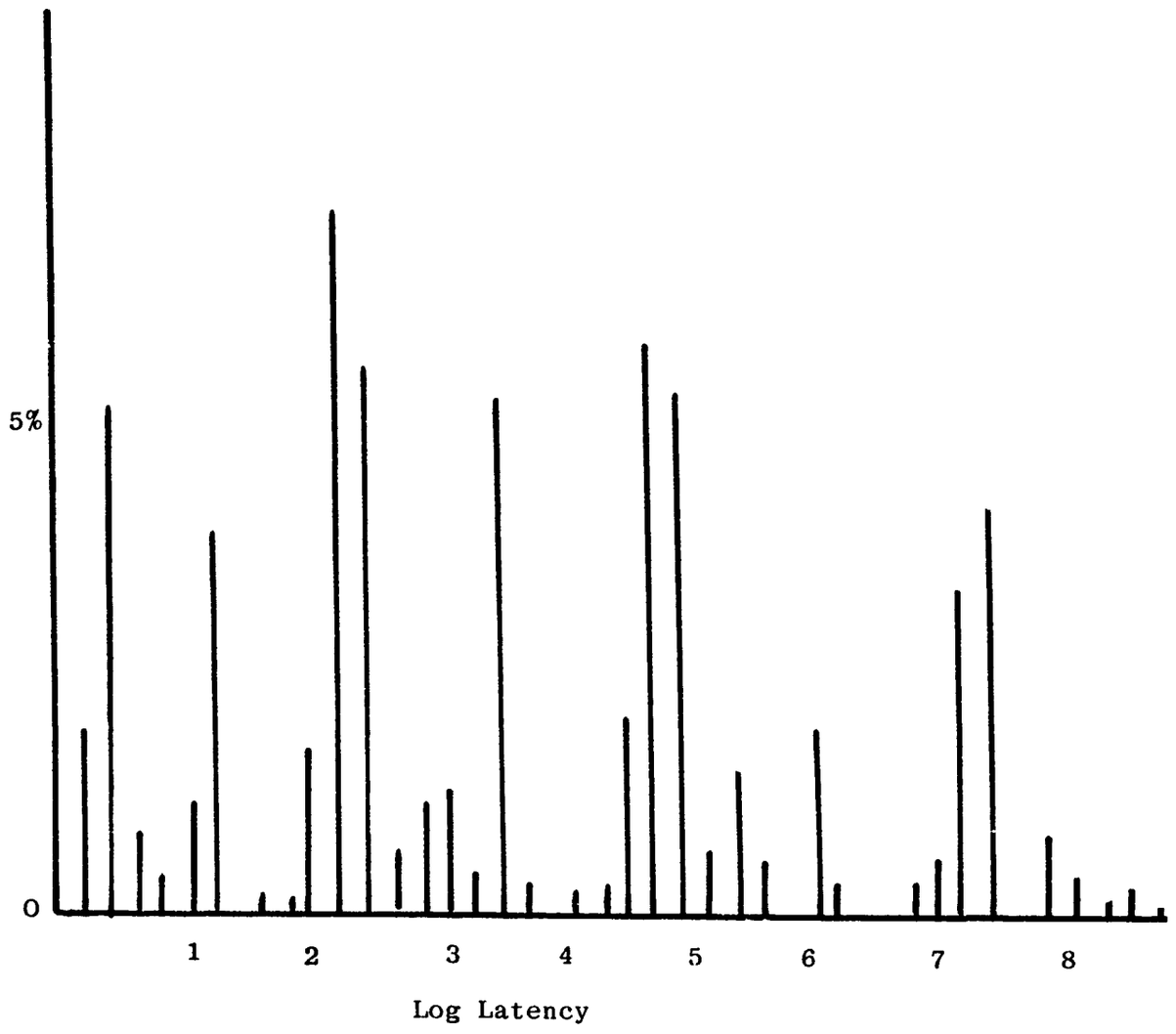


Fig 3: Latency analysis for interception/classification group decision task of earlier studies (details given in the reports cited). In this re-analysis of data retreivable at the moment the relative frequency of a response of given latency is plotted against Log latency (there is no requirement to respond within a fixed interval, though rapid response can pay dividends to the subject).

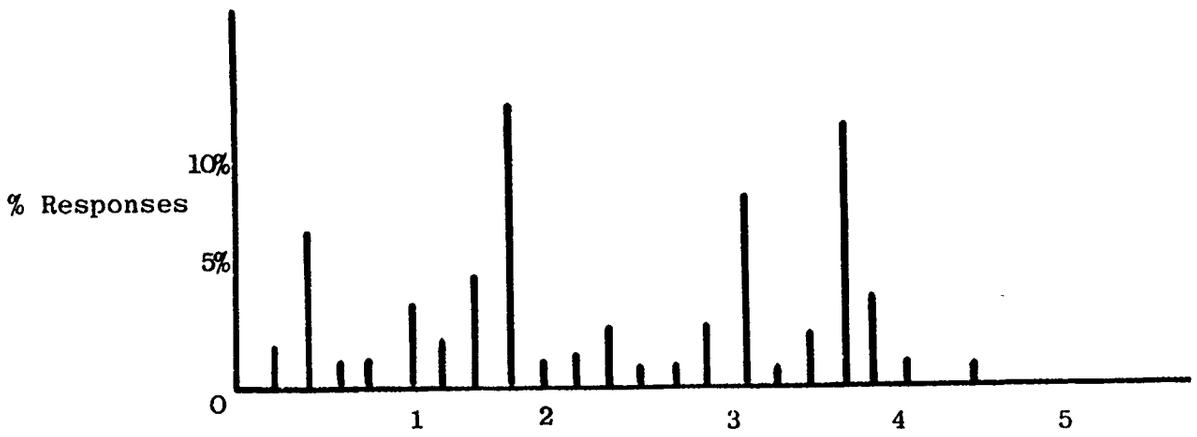


Fig 4: Latency records as collected from a coin operated gaming machine and monitored on digital magnetic tape. Recording starts at moment coin is inserted and finishes at maximum playing interval allowed by this gaming machine. There are two controls, used either by a person, by partners, or protogonists and records indicate only latency (in the active mode) between any movement of either wheel. Even crude records of this type shown quantisation of latencies which can be intuitively referred to the exercise or particular component skills.

in a public bar, "Decision Making"; perhaps, it is decision making of a kind. But it is certainly not the kind of decision making of significance in complex command and control systems.

2.3. Improved Systems

Although the results were of little immediate worth, the exercise provided valuable information about what is required to obtain a coherent and quantifiable image of decision making, and the next step was to introduce several variations. The gist of these is contained in an edited abstract from progress reports. To avoid mere repetition of essays that proved (at that stage) abortive, only the successfully run systems are described below.

"2.3.1. Modified System

(1) The game was modified so that the player has two starships at his disposal. An immediate advantage is that in the event of the loss of a starship, the other ship exists as a reserve. A second advantage is that both ships may be moved in sequence across quadrant boundaries, with the loss of only one stardate. This gives the player the possibility of searching more of the galaxy in a shorter period of "time". The disadvantage was that of keeping track of the locations of the two starships. The main reason for introducing this modification is that it is possible to exteriorise distribution of control, and the delegation of authority.

(2) In the original game, Klingons were randomly distributed through the galaxy and an individual Klingon was stationary in its quadrant. In the variant Klingons move within their quadrant according to a (learnable) pattern. The antagonist is, to some extent predictable.

(3) In the original game, there is a finite number of Klingons at the outset. At the end of a successful game there are no Klingons in the galaxy. In this variant the overall number of Klingons remains constant; when a Klingon is destroyed a new Klingon arrives in another, randomly selected, part of the galaxy, (a steady state condition).

(4) In the original game a player is restricted to a view of at most a 3 x 3 segment of the galaxy, using the "long range scan" option. If he wishes to know the general configuration of Klingons, stars and starbases in the galaxy, he has to move (by warp drive) and build up a picture of the galaxy as a whole as a composite of successive scans. In this variant the player may request a "galactic scan" showing the current state of the whole 8 x 8 array. In addition, he is informed of the location of the starship with which he is currently operating.

(5) The "galactic scan" option is available only if docked at a Starbase, otherwise, there is no price to pay for overall information. The information is provided on a high definition storage tube.

(6) In the original, there is one Starship. In the two ships version each starship is allocated in its own visual display unit (on which "long range" and "short range" scans are shown).

(7) The energetic parameters of the game (energy available, energy required to kill Klingons, energy costs of travel, energy lost from an enemy attack) were "tuned" during the pilot experiments to make the game challenging to play, to require the player to monitor his resources without making the game unplayable.

(8) In the original, the initial configuration of the galaxy varies from game to game. The number of stars, Klingons and starbases varies within fixed limits and their locations are assigned randomly.

For test purposes, where subjects play, after practice, under standard conditions, and comparisons are made between individuals, it is necessary to determine the initial conditions for each play.

2.3.2. Results Obtained

All told, some 150 hours were devoted to experimenter monitored trial plays with the several variants of the space war game. Twenty four subjects have taken part, fifteen in other-than-pilot experiments.

Apart from practice runs, these subjects had no previous experience of the game. (In contrast, up to this point, it was of interest to question a sophisticated subject about his experience with different versions of the game and to explore the changes in performance that arise with repeated plays). In general, there is an improvement of performance over 3 or 4 plays with the same game version, after which the subject sticks with a fairly stable approach to the game, except for occasional "fun" manoeuvres - such as seeing if it is possible to torpedo a starbase or a starship (it was).

The subject population is drawn from students in some form of higher education, preferably having a wider variety of subject matter interests and abilities; from backgrounds in Arts and Humanities to the Physical Sciences, and Engineering. All subjects taking part also carry out the Spy Ring History Test for learning style. During play and after playing the space war game, all subjects are questioned in some detail.

The main findings that emerged are :

(1) Subjects differ in the extent to which they work "locally" or "globally". "Global" working means an attempt to build up a picture of the galaxy and its contents and within that picture to keep a track of the locations of the starships as they move through the galaxy.

In contrast, a subject working "locally" makes little or no attempt to build up a picture of the galaxy and correspondingly, does not know where his space ships are located - contact with Klingons and starbases is fortuitous, limited by what can be seen on the current long range scan (3 x 3 segment). Subjects report having "intuitions" or "feelings" about their locations (as when, for example, they move in a direction which they feel is to a part of the galaxy not previously explored).

(2) Subjects differ in the extent to which their searches of the galaxy are or are not systematic. In respect to the "local", "global" difference noted in (1), it is true that to perform effectively, a subject requires some view of his own movements; but this may be achieved by a local (systematic) rule; such as "move 3 quadrants right; repeat manoeuvre until a boundary is reached". Either globally or locally oriented subjects may or may not follow systematic rules of search.

(3) There are marked differences in behaviour with respect to the use of the two star ships that are available.

The most efficient mode of systematic search is that of moving both ships "in parallel". In this way, twice as much galactic space is searched for the loss of a given number of stardates. Some players do adopt this manoeuvre even though it leads to conceptual overload (the need to control both ships and to keep track of their state as well as their position in space).

A (marginally effective) behaviour, adopted by about half the subjects; by most,over some intervals, is alternate use of the ships, changing from ship X to ship Y, say, when ship X arrives at a part of the galaxy where no Klingons are to be seen.

An (overall ineffective) behaviour in the "two ship" mode (adopted by a few subjects), is to concentrate upon and use one ship only; the other ship is a reserve that is used only if the first ship is destroyed.

(4) Although there is plenty of evidence for both division of attention and (in contrast) direction of attention between the ships, it is difficult to avoid confounding overload effects and the provident deployment of both vehicles. The process was not, in the first place, genuinely parallel (simultaneous displays, one for each ship, are certainly updated but commands are issued in sequence). Moreover, the idea of delegating control is not adequately implemented because the details (and overload details) of manoeuvring the ships increase as soon as a parallel mode is adopted. Between them, these features of the situation

are sufficient to account for the overload often observed.

(5) The use of different weapons ("torpedoes" and "phasers") becomes habitual during practice. The choice of weapons (to use a "torpedo" or a "phaser") is often position dependent and when it is not appears to reflect the subject's irritation rather than any well considered tactic. The comment applies only to a situation of this kind and, clearly, choice would be desirable in a system where, for example, continuous motions were displayed".

2.3.3. Questioning Data

The questions asked of subjects were open ended within a framework that developed during pilot runs. It is possible to ask specific questions that are also relevant questions (ie. relevant to the task, as it is perceived by the subject) only if a certain latitude is allowed, because subjects differ a great deal in what they regard as specific and learn, in the course of play, to regard different concrete features of the task as being relevant.

For example, subscribing to this notion that people choose between alternatives; that commands are alternatives, that states of the environment are alternatives we ask "which command do you mean to select next"? or "what do you want to achieve next"? or "what density of Klingons did you encounter since I last talked to you"? (giving sensible alternative-value-ranges).

Some subjects react to these questions easily, at the outset; replying, for example, "move ship X to the next section on the left", or, "get rid of the Klingons in that region", or will select a value range "between 15 and 20".

Other subjects do not, even at the outset.

For example, they can only say "which command" as a result of working out the most plausible value of "command" in a complex conditional statement; for, if allowed to say so, they are contemplating plans of action in which, of course, commands necessarily figure, but in a usually conditional manner. The open question "what do you want to achieve next", elicits such a plan; the required commands often being implicit rather than explicit. Finally, although it is certainly possible to elicit an answer to any real and public enquiry (such as Klingon Density, when both

subject and experimenter have observed Klingons), it may seem were natural to the subject to reply "a criss cross pattern", or "in clumps"; the answer to the density question being inferred from the more immediately evident pattern.

This much variation is observable right at the outset (more definitely after practice, of course) and individuals differ a great deal. Learning or simple experience in the task tends to increase the sophistication (it does so, for initially simplistic subjects, and thus, on balance, reduces the variability).

Whilst it is hardly surprising to discover that subjects learn to plan, and to describe their environment the ubiquity of this phenomenon deserves emphasis. The meaning of perceptually discrete entities like Ship X, or Ship Y, changes; so that they are seen (by some subjects) as actions in a plan, or, conversely. (by other subjects) plans of action are seen as attributes of Ship X or of Ship Y.

In general, for any action that achieves a result or any result achieved by some action, there is a progression of meaning. On the one hand, entities become embedded in larger conceptual organisations. On the other hand, there is a converse effect, that actions or manoeuvres which are initially open to description, slip from awareness, and are performed, later on, automatically as habits. Phrased differently, there is a change in the quality or doubt or uncertainty.

Regularities in the converse (habit generating) phenomenon are hard to capture over a brief experimental session, but are shown up, clearly, on some data obtained from a substudy introduced as part of an ongoing enquiry into "learning to learn" (Appendix 3). The data shown in Fig 5 relates to degrees of doubt about result (the answer concerning a "which" or "what" type of question) and doubt about method (namely, the answer to a "how" or "why" type of question) as a function of rated familiarity of topics in mathematics and language interpretation.

Here, of course, the effect is long term. For the sample used (with background very similar to subjects in the decision experiments), there is a strong tendency to know how to perform unfamiliar operations (like finding n^{th} roots, or n^{th} powers), but little confidence in selecting a correct response. Frequently, also, the method is shaped by the form of question (exclusion of implausible alternatives, contingent exclusion) rather than mathematical manipulation, in general. Conversely, for familiar topics, typically addition or multiplication, the method is obscure; probably many methods are used and it is hard to determine which one is used, if one, in fact, is used. However, the correct response is selected with confidence and often rapidly.

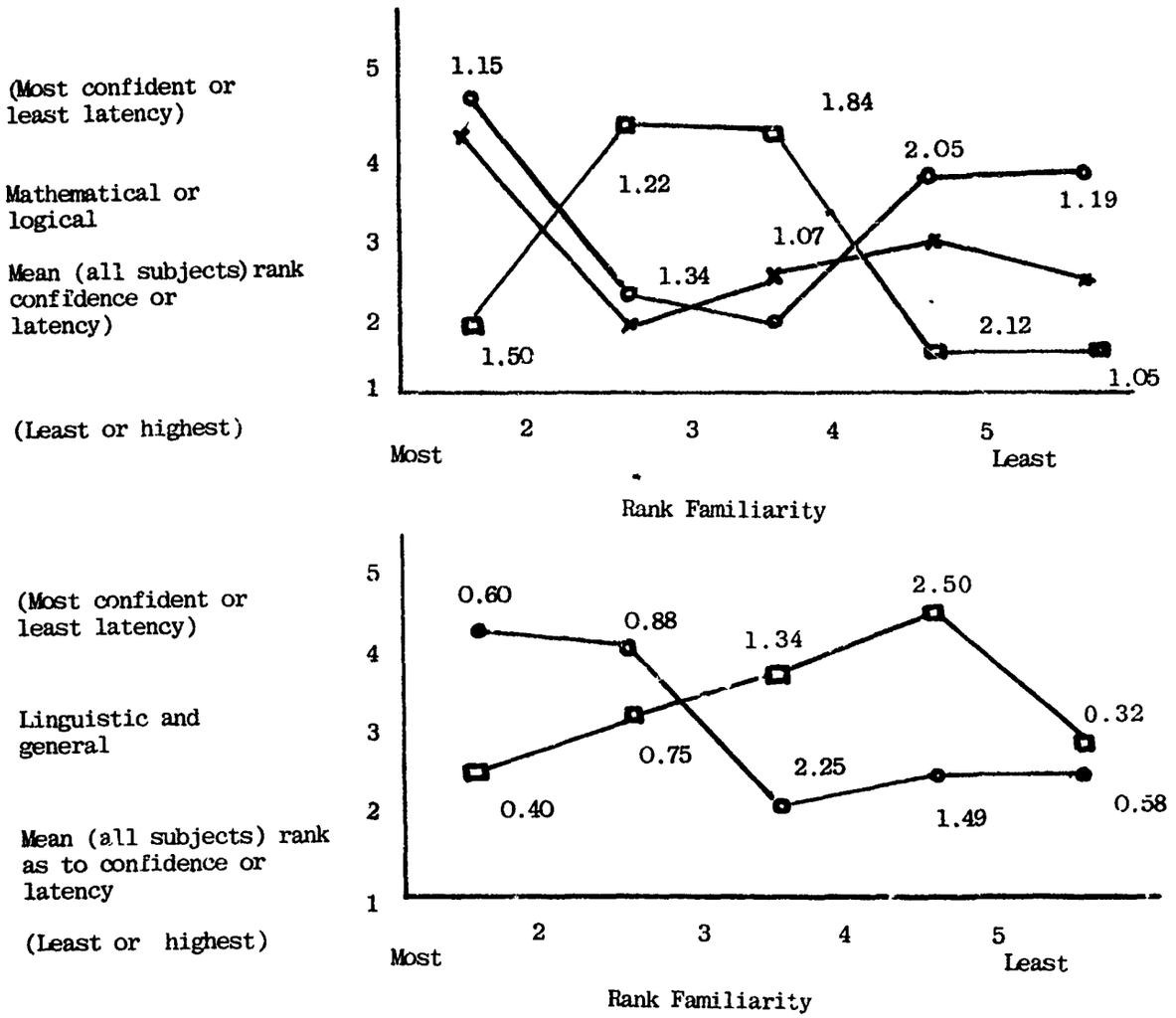


Fig 5: Mean Rank of Response (Direct Answer, Outcome) latency for correct respones ✘ , and for all responses ● and the Mean Rank confidence ◘ as to method (if any , regardless of correctness) are plotted against the individual rank of familiarity and recency of learning a concept for each topic. Mean over 66 subjects for mathematical and logical topics, over 50 subjects for general and linquistic topics. Standard deviation is calculated as an index of "scatter" for o and ◘ only ("correct", ✘ points are widely dispersed).

There is no "correct"response to the linguistic and general questions, for example, to "Intelligence is most reasonably described as
(a) The quality of intellect or
(b) The quantity measured by a psychological test or
(c) An ability to reason logically "

It looks as though the same effect is taking place on a miniature scale, as decision subjects learn to deal with initially unfamiliar manoeuvres (such as getting to a stipulated point in space, or avoiding an obstacle) and complex (planned) operations.

2.4. Relation Between Performance and Scores on Learning Style

There is a fair correlation between scores on the test for learning style and the behaviours exhibited by subjects; a much more impressive correlation between the effectiveness of their behaviours as judged by knowledge of the galaxy (answers to questions) and of what plan or plans they are carrying out (again, as judged by asking them). This data is shown in Tables 2 and 3.

In summary, it appears possible to predict success at different (for example, global in contrast to local) aspects of a many faceted task. This is not at all surprising for the tests for learning style do predict competence at different kinds of explanation and prediction quite reliably, not only in the acquisition of knowledge, but in design. However, these scores are not directly related to anything which could be called "decision" or "decision style", excepting insofar as it is influenced (which it surely is) by learning important skills, including the skill of gaining information about states of the environment.

For example, subjects with high versatility scores tend to have a more systematic approach, and to predict the (learnable) paths of Klingons; to keep track of their ships, and so on. But it does not follow that a versatile (or any other recognisable type, of subject) is"better" at playing in this situation, better at dealing with unexpected configurations, or at resolving doubt.

2.5. The Quality of Decision Making

Inability to predict decision quality is part of the more fundamental problem of how to evaluate performance in a situation of this kind. For example, it is easy to determine the number of Klingons eliminated or the energy expended per Klingon eliminated; it is more difficult, but still possible, to estimate carefulness in ship control (anticipating contingencies and maintaining energy level). Such valuations of performance will change, for an individual having a complex repertoire of skills

Subject Number	N	O	C	V	a	b	c	d	e	f	g	h
1	81	78	77	65	80	66	51	50	90	17	53	80
2	22	12	53	0	6	57	5	4	11	18	46	63
3	85	53	63	47	64	74	18	27	70	24	60	85
4	64	64	33	8	24	20	58	6	5	26	61	50
5	88	65	76	35	60	80	54	22	67	33	70	84
6	76	50	63	34	60	81	47	20	63	40	66	90
7	50	79	55	46	70	79	78	35	64	15	48	85
8	85	60	58	33	49	75	60	26	58	18	69	57
9	83	52	45	46	75	34	59	33	57	17	61	86
10	53	12	24	0	6	12	2	2	12	27	57	49
11	55	54	32	21	30	11	44	16	29	22	58	60
12	80	84	83	67	90	78	81	51	88	43	49	92
13	83	53	48	41	52	65	19	45	60	61	91	75
14	88	78	77	0	8	60	61	3	5	15	82	47
15	55	32	75	80	88	90	40	55	95	50	58	89

	N	O	C	V	a	b	c	d	e	f	g	h
Means	68.53	55.07	57.33	34.87	50.67	58.8	45.8	25.67	51.6	28.33	60.4	72.87
SDs	19.16	22 28	18.51	25.32	29.38	26.58	24.56	18.24	31.34	14.17	19.89	16.54

Table 2: Data from 15 subjects under revised conditions and scores of the subjects' neutral, operation, comprehension and versatiloty scores are recorded. As these aggregates are, so far, the most reliable estimates when judged against a large sample test and retest population (Appendix 4). The Spearman's rank correlation coefficients are shown together with the scores on the tests and various properties, both of behaviour and answers to questions. Critical values of Spearmans Rank Correlation for n = 15 are 0.456 (for $0.05 > p$) and 0.645 (for $0.01 > p$)

Key

Stylistic Tests

N = Neutral score "Spy Ring History Test"
O = Operation Learning Score "Spy Ring Hisotry Test"
C = Comprehension Learning Score "Spy Ring History Test"
V = Versatility Score "Spy Ring History Test"

Questions correctly answered. These scores have a necessarily evaluational component in determining if an answer is correct or not.

Behaviours

a. = Plans or hypotheses stated that are subsequently followed up, successfully or not, (see h)

b. = % Correct Klingon position predictions.

c. = % Correct density or energy estimates

d. = % Correct response to where are ships and objects in space.

e. = % Time operating ships in parallel

f. = % Time operations concurrently by mean number of operations per hour

g. = % Correct density or energy estimates

h. = Number of plans or hypotheses stated

	a	b	c	d	e	f	g	h
N	0.087	0.169	0.230	0.050	0.066	-0.045	0.819	-0.086
O	0.353	0.197	0.866	0.315	0.215	-0.297	0.048	0.018
C	0.551	0.686	0.526	0.486	0.600	0.026	0.022	0.416
V	0.970	0.601	0.318	0.942	0.912	0.261	-0.274	0.803

Table 3: Spearman Rank Correlations between Spy Ring History Test and main variables (n = 15)

	N	O	C	V
N	-	0.306	0.409	0.075
O	-	-	0.527	0.273
C	-	-	-	0.501

Table 4: Spearman correlations for n = 15 subjects, N O C V scores with each other

	a	b	c	d	e	f	g	h
P1	-	0.620	0.471	0.886	0.871	0.173	-0.263	0.846
P2	-	-	0.269	0.614	0.746	0.312	-0.008	0.674
P3	-	-	-	0.338	0.192	-0.411	-0.002	0.195
P4	-	-	-	-	0.372	0.292	-0.242	0.685
P5	-	-	-	-	-	0.342	-0.285	0.755
P6	-	-	-	-	-	-	0.135	0.351
P7	-	-	-	-	-	-	-	-0.304

Table 5: Main Variable Inter Correlations

and competence, as an arbitrary change is made in the situation (for example, the variants noted in Section 2.3.1) or even in the subjects view of the situation. Surely decision is no one skill; it requires the exercise of many skills and their coherent and well anticipated execution.

The best behavioural index of "decision making" in this situation (which most people would rather glibly agree to be a "decision task"), is probably an ongoing record of relations between the exercise of various skills and, in particular, perhaps of response to contingencies that appear, from any well informed perspective, as unexpected contingencies.

For example, it is tempting, but actually trite, to say "the subject decides between commands", or "between sources of information"; maybe, the subject does but ability to perform these skills is not, in itself, an indicator of his style or quality as a decision maker. All the skills and their organisation are implicated and the best behavioural index to calculate is a measure, in fact, of how good an "all rounder" the subject is (checking, or taking as given, competence at performing the constituent skills).

For the reasons noted in Section 2.3.2 and others to be discussed in Section 2.6 the situation does not adequately or optimally exteriorise behaviours that reflect skill organisation.

However, these defects can be (and have, substantially, been) remedied so that an "all rounder" index is calculable. For a known configuration of tasks an "all rounder" index is probably the most useful directly behavioural measure (and, in practice, it is often possible to specify a task configuration).

2.6. The Management of Awareness and Doubt

Although a directly behavioural "all rounder" index is of value, I am convinced that an assessment of the style and quality of decision makers, in this situation, would be more reliably based (an assessment is, in practice), upon some kind of ongoing interrogation.

Here, the interrogator is the experimenter who sits with the subject, and the situation (once the initial task parameters are specified), is under the subject's control. The experimenter asks the subject why he got into a certain

position, how he plans to proceed, what information he has, or intends to procure; the "how" and the "why" of his actions, and intended actions.

In real-life, the interrogation is performed by an experienced decision maker and the situation is often partially under his, rather than the subject's, control (though the subject or candidate can usually exert some control and must express his intentions).

In real-life, the evaluation of a candidate decision maker is frequently confounded with the process of training him. Consider, for example, the decision capability of an aircraft captain; who has already exhibited competence in the essential skills of flying an aircraft of a given type. In this case, the assessor is often an advanced instructor, concerned, also, with training the candidate to avoid rare and hazardous conditions, which he has encountered but the candidate has not; the candidate flies, but the advanced instructor impels him to face hazards and, if he fails to deal with them, will remedy matters on the candidate's (the subject's)behalf.

Acting in the capacity of an assessor, the advanced instructor's primary concern is the determination of the candidate's (the subject's) rationale for doing what he did to avoid the previously unencountered contingency, whether or not he was successful, ie. did the "right" thing. For, in assessing this flier as a captain, he is mostly concerned with how the candidate will react to contingencies that neither of them have encountered; maybe, that have not been anticipated by anybody. That is, of course, on the supposition that aircraft captains are intended to "decide", or to be responsible; that their ability to fly is already manifest and an ability, also to organise many different skills.

The experimenter, with no advanced training role, is in a specially "pure" position which makes it possible to dissect out a crucial feature of the assessment interrogation; namely, that it is not predetermined (as the check lists of elementary training are predetermined). In no essential way is the subject a candidate replying to a questionnaire (the type of question is preordained, the content is not). The content is determined by the subject getting himself, unavoidably, into tricky situations, which differ for different individuals, and he is questioned (in a fairly systematic way), about the rationale of what he does to improve matters.

2.7. The Status of Decision Analysis and Similar Methods

There is a prominent school of thought which regards decision in a game like situation as rational according to game theory or standard decision theory. Presumably the situation under scrutiny is game like (it is called a game) and, thus, belongs to this general category. The situation is complex and intractable compared to most laboratory tasks (but nowhere near as complex as real life).

There is obviously no straightforward format (of moves, strategies, and the like), determined a priori. But certainly, it would be possible to carry out a decision analysis, the aim of which would be to determine how the subject conceptualised the situation, how it is to be modelled (as a matter of agreement, since there is no unique model) and, having done that, to determine strategies leading to interim outcomes over which preferences would be elicited and, independently, probabilities calculated from factually updated prior beliefs.

I am presupposing a liberally minded decision theorist and note that the conversational process of decision analysis, involving compromise and agreement, is not unlike an ongoing, context sensitive, interrogation. Hence, on these grounds, the method is one potentially valuable method of tapping the potentiality of a decision maker. It does, however, have flaws in it. These are concerned with the format of the target representation (in terms of values and probabilities) not with the conversational process of decision analysis itself.

The methods adopted up to this point and, for that matter, those to be considered later in the report, are a form of decision analysis, proceeding "on line", as the task is performed.

There are important differences, however, in the normative structure, especially evident in the sequel. It is not assumed, for example, that a conceptual or actual model (the decision makers world view) can be represented as a strategy tree, or even a union of strategy trees; hence, it is impossible to require the assignment of probabilities and preferences over outcomes, either terminal or intermediate. Nor, even if the required structure did exist, would the subject be asked to express expectation, belief, or likelihood independently of preference; it seems that all actions and plans of action have value and that their feasibility, likelihood and desirability are inextricably mingled. It may be

true that some subjects express their sense of likelihood as a probability, with the usual properties and open to the usual inferential manipulations. But this metric is not required (and, from recent observations, is rarely, if ever, employed). The norms of the system, so far as the analyst is concerned, are to converse as clearly as possible and to maximally exteriorise the rationale of (the intention behind) whatever behaviours are provided by the situation.

2.8. Modifications Introduced

At this stage, after more than a year of research, some useful and suggestive results had been obtained, but several defects were evident in the experimental situations constructed up to this point. The chief inadequacies are listed below in the context of "games against nature" (with the exception of the pilot study of Section 2.1. the only games examined, for we had not yet come to grips with "team decision" in a laboratory setting). It may be noted, however, that the defects in question would appear as blatantly nonsensical in the context of team operation.

(a) The two ships, X and Y, (introduced as a means for exteriorising the distribution of control), were exploited in spite of the fact that their parallel activity is, in certain senses "phoney". The two ships do provide simultaneously viewable displays, but commands are necessarily alternated, and executed in sequence.

(b) A much more serious reason for the perjorative "phoney" is that, apart from speed of operation, and arbitrary restrictions upon rate and information load, anything done by the conjoint manipulation of X and Y could be done by fast and clever manoeuvring of X alone or of Y alone; there are no other-than-arbitrary conditions under which Ship X and Ship Y must be cooperatively employed.

(c) There are several means of securing the need, or advantage, of cooperative employment. It is important to select a means which is salient in the subject's appreciation of the task, and there is firm evidence (very beautifully summarised in Broadbent's account of economic simulations in a Business School) that complex numerical constructs do not stand out in an appropriate way. For example, it would be mathematically sufficient to ordain a superadditive payoff function; this, however, is not likely to impress the subject with the need for, or the advantage of, engaging the ships cooperatively and, still less, to indicate differentially, circumstances that are and are not aided by cooperative deployment of these

vehicles (notice; these are circumstances in which cooperation must take place. It may take place, with advantage, on many other occasions).

(d) In fact, pilot experiments had been carried out with other-than-planar connectivities of space, and partly irreversible (or reversible only by cooperative action) changes in connectivity. As these trials showed general appreciation of topological changes, and ready recognition of different topologies (for example, cylindrical, toroidal, and planar), the need for ship cooperation was introduced by a repair rule; breaks in the connectivity of space are irreversible, unless repaired by the joint action of both ships.

(e) The "game against nature" is inherently unrealistic in the sense that a player does not damage or disrupt the environment by haphazard or improvident actions; for example, the dissipation of more energy than is needed to achieve a given result. In real life, the environment (player and all) can be literally demolished by wilful or imprudent actions. The situation was modified so that this became the case. Ships and supplies are not arbitrarily replaceable. Moreover, the connectivity of space is broken (and may only be repaired by ship cooperation) if too much energy is dissipated in one neighbourhood.

(f) The role of "player" is quite well specified in games of chance, or even in games of intelligence that terminate under specified conditions. But "player" does not seem to capture the role of a participant in a complex command, control, and communication system. This becomes evident even in the laboratory for subjects fell into the habit of talking about "moves" to the experimenter yet, as commented previously, the same subjects say they are not really deciding about "moves". It turns out that the subjects indulge in a kind of double talk, to please the experimenter, perhaps. They conceive the system as though there were some ongoing activity; trade, or communication, or transportation and humour the experimenter by supposing there is not (since the experimenter told them that no such activity took place).

This discrepancy between what is, and what is imagined, was remedied by introducing an activity (trade between starbases, whereby the overall starbase economy is maintained).

One immediate consequence of the innovation is that "player" is replaced by a far more complex role; someone who is engaged upon a mission. The mission includes, but is not limited to, maintaining Starbase trade against the assault of marauding Klingons.

Having discarded "player" as a role, there is no unique termination to "play". There are several possibilities; for example, that "play" continues until a term of duty is ended when the mission is taken over by some other person or that the mission is not successfully accomplished and the Starbase economy collapses (together with the controlled vehicles).

(g) Although "randomness" is harmless enough in games (and is a loaded term, in the analysis of games of chance), it has no place in a mission. A subject cannot predict the unpredictable and is in ignorance of some features of a sufficiently complex system, especially if access to certain information is prohibited, obstructed, or cost limited. In this special sense, the situation seems "random" but, in fact, it is deterministic and it may as well be completely deterministic. What the subject does and does not learn depends, to a large extent, upon the subjects' behaviour (for example, in the situation just described, some subjects learn to predict the path of Klingons, once generated; others, learn about the distribution of objects in space).

All the systems to be discussed in the sequel are fully deterministic.

(h) Finally, there is the requirement of team decision. At the point where the modifications listed as (a) to (g) became manifestly desirable, it was also true that serious attention had to be directed towards the team aspect of the project.

Here, the notion of "game", abraded by incorporating "mission" as the subject's aim in life, is ultimately discarded. For, surely, a team system may be regarded as a "game" only insofar as its payoff structure is substantially invariant; at least to the extent that the "game" is competitive, or cooperative. It was maintained at the outset that there is no reason to believe real life situations can be tagged in such a neat and tidy manner. Competition and cooperation between the team members, (as distinct from the cooperative deployment of vehicles, which may, and does, occur with one person) fluctuates from moment to moment, if that opportunity exists.

This view is amply supported by the evidence, subsequently garnered. There are moments of stress or hazard, when team members act in a fully cooperative manner in order to survive. Otherwise, they act as people do, neither as utterly avaricious, rational, automata, nor as utterly gullible tools in the hand of a manipulator.

3. Reformulation of the Task

When the project started it was considered possible to use a generally game like situation, and to investigate team decision making by means of a lengthy, but standard, experimental design segmented into coherent parts. The proposal, for example, submits this possibility, and though the practicality of such a design is questioned, there was general agreement, at that stage, that the "obvious" should be tried out. For example, one "obvious" design, which fits the brief, is shown in Fig 6.

Pretest for conceptual style	Test for Decision Style	Training session one person	Planning Mesh Elicitation	Operational Session(s) One Person	Planning Mesh Elicitation	Operational Session(s) For Team	Post test for Conceptual style	Post Test for Decision Style

Fig 6: One original Experimental Design

Both the underlying ideas (a "game like" task and a "partitionable experimental design") were tried out, to an appreciable degree, in the pilot experiments.

But the data from these experiments supported our intuitions that neither philosophy was up to solving problems concerned with decision making in complex systems and, in particular, with the complexity added as a result of investigating team decision making. At this juncture both "philosophies" were set aside; yet, of course, the technical difficulties of realising and implementing a different "philosophy" remained to be overcome.

The view henceforward adopted is that decision is a systemic activity; a process for achieving a mission (the mission, as presented to the subjects, is described in Appendix 5); that team decision making is a conversational process, of which the individual is a limiting case insofar as individuals adopt different perspectives in different contexts and these perspectives may be said to "converse" with each other (a normally "internal" conversation about the pros and cons of an intended action); that decisions are made when there is an essential bifurcation in the process, that changes the decision maker's frame of references.

Given this interpretation of the phenomena under examination, one would hardly expect to sustain a partitioned experimental design, except for the pretest of conceptual style and the post test of conceptual style. The following subsections bear upon the issues of decision style determination and the elicitation of planning meshes, intended to exteriorise the normally hidden mental operations whereby decision makers, either individuals or teams, arrive at a world view. Section 4 is a brief account (which is expanded in Appendix 6), of the extent to which the present implementation is able to accommodate the systemic or conversation theoretic point of view.

3.1. Decision Style and Conceptual Style

One of the underlying objectives of the research was to determine decision style as distinct from conceptual style, and, if possible, to predict how decision makers are likely to perform by means of a test for decision style. Whereas conceptual style does characterise learning and some aspects of performance over many tasks, decision style was believed to characterise the way that people deal with doubtful situations (and, as noted in Section 2, "doubt", or "uncertainty", is many faceted).

Some informal experiments were carried out (only 6 subjects, so that statistical analysis is inappropriate), to obtain verbal reports of decision making heuristics of the type described by Kahneman and Tversky (1976) in static choice situations, like those employed by these researchers, with much larger samples of subjects. The findings are interesting insofar as two subjects invariably interpreted conditional probabilistic situations as causal situations; two subjects repeatedly (and all of them to some extent), relied upon argument by similarity, another heuristic reported by Kahneman and Tversky.

In this sense, it is possible to characterise people as, for example, causally biassed, or similarity biassed, problem solvers; the phrase "problem solver" is used to indicate that the characterisation is valid for passive or static situations.

Another type of test was based upon materials of the kind used by Philips, in his Probability Assessment Questionnaires; again, it is possible to repeat the findings reported by Phillips as part of his major study. There are individual differences, of which Phillips is mainly concerned with cross cultural differences) between "overestimators" and "underestimators" and there is a common tendency to dichotomise (to reply "certain' about the response to a question when the confidence estimate is "very sure"; over 80% or so).

In this case, a larger sample of subjects were examined and the data is summarised in Table 6 (showing certainty that a response is correct, when in fact it is correct; certainty that a response is correct, when in fact, it is not correct, obtained for recall of patterns, of rules, and of facts). The relation between these subjects scores on the tests for conceptual style and their degree of assurance is shown in Table 7.

The question is whether or not individual differences picked out by paper and pencil type tests, either of problem solving heuristics or degree of assurance in a recall response, carry over into dynamic and complex decision situations. For, both the "problem solving" characterisation and the "degree of assurance" characterisation are candidates as indices of Decision Style.

The empirical answer to this question appeared to be (and is, at this stage, known to be) complex, for the "problem solving" characterisation and negative for the "degree of assurance" in a response. There are no easily detected relations between "static" test data of this kind and "dynamic"performance. The disparity is not altogether surprising, in view of the pilot experimental findings but really pinpoints a differing usage of "Decision Style".

The "static test" indices of decision style are perfectly defensible, insofar as they mark individual differences in the context of problem solving and recall tasks.

It is probably true that if Decision Makers are confronted with "problem situations" as they fairly often are in a complex system, then they are more or less inclined to impute causality (the similarity and difference reasoning, of which causality is a special case, is ubiquitous, though people are doubtless biassed to a preferred manifestation of this reasoning method; to one or other of the modes of analogical reasoning as, for example, abduction, and resolution). By the same token, it is likely that Decision Makers are true to type when they encounter "Confidence Estimation situations" as part of a complex decision system. The fact is (partly because situations are to an appreciable extent determined by Decision Makers), that "confidence estimation situations" are rarely encountered as an integral part of the decision process, so the hypothesis is difficult to test. The fact that we, and other experimenters contrive to have "confidence estimates" elicited, is beside the point; people are "underestimators" or "overestimators" under these circumstances but (the negative finding cited), their performance in a real decision process is not obviously related to their disposition.

CABIN: SINGLE

Base	Base Visited	Base Enquiry	Current Base Energies	Base Energy At Enquiry	Total Invest-ment
a					
b					
c					
d					
	Max.No of Klingons	Total of Emergen-cies	Current Energy Ship X	Total Hole Repairs	Total Loss to Klingons Ship Y
	Klingons Destroyed	Total No of Holes	Current Energy Ship Y	Total of Cracks	Total Loss to Klingons Ship Y

	1	2	3	4	5	6	
Tactic Selected							Ship X
Stop if Energy =							
Base to Visit							
Total Times Used							
Selected							Ship Y
Stop if Energy =							
Base to Visit							
Total Times Used							
Commands							
Info Type							
Cracks	1	2	3	4	5	6	Routes Blocked

Table 6. Individual Task Layout for records (one per session). The corresponding Interrogation Question and Responses (See Table 9 for interpretation) are recorded on next sheet.

TWOMAN:

Cabin No. (A or B)

Base	Bases visited	Base Enq.	Current base energy	Base energy at Enq.	Total Invested
a					
b					
c					
d					
	Max. Klingons in any local scan	Total of emergencies	Current energy Ship X	Total Holes Repaired	Total Energy loss to Klingons
	Total Klingons Destroyed	Total Holes Caused	Current Energy Ship Y	Total Cracks Caused	Total Cracks Repaired

COMMANDS

Used. in order of use												
Type of info. asked for												
Cracks	1		2		3		4		5		6	Routes blocked
Tactics	1		2		3		4		5		6	
Selected												
Stop at energy =												SHIP X
Base to visit												
Total times executed												
Sleected												
Stop at energy =												SHIP Y
Base to visit												
Total times executed												

Table 7. The Team Task Layout (repeated in recording sheet A first, B next). The corresponding Interrogation Session Questions and responses are recorded on next sheet (see Table 9 for an interpretation of question numbers).

An index of context dependent Decision Style (or, in general of Systemic Decision Style) can only be obtained in the system, for example, by the Decision-Analysis-like interrogation of Section 2.8. In other words, Decision Style, in a complex command and control system, has a meaning quite distinct from the same phrase used to identify individual differences manifest when people are placed in the fixed context of a problem solving, or questionnaire answering, situation towards which an individual may be assumed to adopt a more or less similar perspective on different test occasions.

The design of Fig 6 was thus modified by deleting the tests for decision style, as distinct episodes, and inserting, in their place, an ongoing interrogation which forms part of the operational mission.

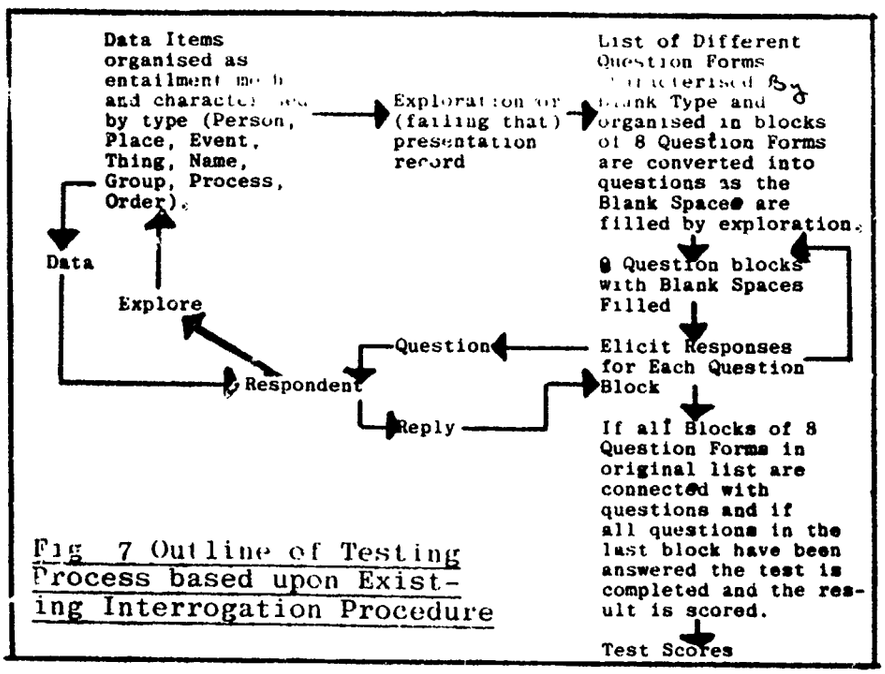


Fig 7 Outline of Testing Process based upon Existing Interrogation Procedure

Interrogation is mediated by a program not, as in the pilot experiments, by the experimenter. The subsystem is outlined in Fig 7. Certain forms of question ("Why" questions; "How" questions, "What" questions; "What do you intend" questions,

"Hypothesis selection" questions and so on) are pre-ordained and so is their relative frequency. However, each question form has "blanks" like "How many "X s" are there between Starbase Y_1 and Starbase Y_2?"which may be filled by data of certain types; for example, "Blank X" may be filled by "Trade Routes" or "Holes", whereas "Blank Y_1" and "Blank Y_2" may only be filled by "Starbase A,B,C, or D. The "question form" becomes a "question with content", insofar as the Blank Spaces are filled, and, until that occurs, no question is asked. The blanks are filled in by logging the situations which have, in fact, been encountered by the subject, and these situations depend, in turn, upon his behaviour. It is convenient to group several questions together, (comprising an interrogation session in which the vehicles are held stationary and the environment does not change), but interrogation sessions feature as an integral part of the mission, and the moments at which they occur depend upon the behaviour of the subjects.

Interrogation goes on both for individual and team operation. However, in the team decision system, it is augmented by an ongoing dialogue between the subjects. This dialogue, is open, apart from a deliberate length limitation upon messages (which are typed into a console with a local display) and recorded on disc. On completing a message, and "sending" it to the other subject, the message is read out (fast, not at typing speed) upon the console assigned, for this purpose, to the other subject.

3.2. Plan Meshes

It was recognised that real decision makers develop a world view in which team decisions are embedded. The world view contains some objects common to all decision makers engaged on a mission (for example, the Spacecraft, Klingons and Starbases), but there may be idiosyncratic "invented" objects and the relation between the common objects is apt to vary from decision maker to decision maker.

The world view is neither entirely descriptive or entirely prescriptive. It is a representation having both a descriptive and prescriptive role; showing, on the one hand, relations between objects and, on the other hand, how objects (such as Spacecraft) can be used to achieve a goal like "protecting trade" or "Eliminating Klingons in a given vicinity" (a goal is itself, an object).

In fact, it is maintained that a representation comprises a local and idiosyncratic theory. Theories are fully discussed in the essays and in other (referenced) publications; they could, equally well, be called

"theses" or "personal expositions". They have the property of relating topics in such a manner that if topic T is derived from topics P and Q, then a concept for, as well as an explanation of, T is derivable from concepts for (and explanations of) P and Q; also, that the explanation of T is sufficient not to lose specificity so that explanations for P and Q are derivable from any explanation of T (this is true except for analogical topics, where information must be fed into the system).

The power of the system is very considerably enhanced if the world view representations are obtained as entailment meshes, in which "objects" count as "topics" (equivalent to the "Action Units" employed, for organisational and training design purposes by the UK Admiralty). The entailment mesh can be manipulated by the THOUGHTSTICKER system, in order to obtain (amongst other things), all possible plans admitted by a representation, some of which are not intuitively obvious. Such a mesh is known as a planning mesh rather than an entailment mesh (the term apposite for theory building).

After some experience in the system, subjects find it quite easy to spell out such representations. Once they have done so, the class of all possible plans given the goals associated with an object (for example, the protection of one particular Starbase economy; the repair of a trade route), can be obtained automatically by "pruning" the mesh and specific plans by "selective pruning". Clearly, many prunings are possible (one for each object, at least), and someone using THOUGHTSTICKER is at liberty to direct his attention to one or several objects (recall, an explicit goal, is itself, an object), that is, to look at the representation from a perspective, or point of view, in which the objects figure as the dominant entity.

There are, however, two difficulties :

(a) A purely technical difficulty, known from the outset, that the LISP routines, which form part of THOUGHTSTICKER are executed in the same machine as the routines for running the space environment and logging the progress of a mission. The hand-over time needed to instate the THOUGHTSTICKER system is appreciable (5 minutes or more). This time is long enough to break continuity, when subjects change perspective or enlarge their mesh.

(b) An unanticipated, though illuminating, difficulty is that subjects regard planning mesh construction as redundant, when they also undergo interrogation (or vice versa) and are seriously annoyed by the requirement to perform both tasks.

Of the two difficulties, (b) is worthy of serious other-than-technical consideration. The subjects are quite correct in their opinion that planning mesh construction

and interrogation do much the same thing and, since they are correct, their irritation in respect of a repetitive task is justifiable.

Because of the technical restriction noted in (a), it happens that subjects usually say they are irritated by constructing or using planning meshes (especially, since the current arrangement requires them to move to another room for this purpose). But this "polarity" is incidental to the real issue of representation.

The construction and manipulation of planning meshes is part and parcel of operation and so, as commented already, is interrogation. These features of the system are not really separable as indicated in Fig 8.

So, for example, instead of asking decision makers to submit merely constructed or selective responses to interrogation questions, about hypotheses and intentions, they should be required to construct a planning mesh (that they can do so has been demonstrated; they would prefer to do so, but they object to doing both). Of the objects related in a planning mesh at a given instant, some have values determined by the space environment and the decision making behaviours; for example, "Spacecraft" and "Starbases" have "energies" or "positions". These (real) values are picked up whenever an object is mentioned (for example, by pruning the mesh from the perspective of this or a related object). Precisely these values are recorded and used, at the moment, for judging the veridicality of an interrogation question response. Other objects in the planning mesh do not have determined values (for instance, "goals" or "predicted trade"). But they do have best estimated values and these should, properly, be obtained from the interrogation responses.

The organisation shown in Fig 8 represents a psychological reality, and a partly realised technical possibility (outlined in Fig 9). An implementation that realises this system, but with inadequate speed and reliability, already exists, and has been demonstrated as described in Subsection 3.5. An efficient implementation is in progress.

In order to show up the operations involved, and to indicate the present condition of the system, it is necessary to digress, in Subsection 3.3 and 3.4, into an account of subsystems that are currently operational.

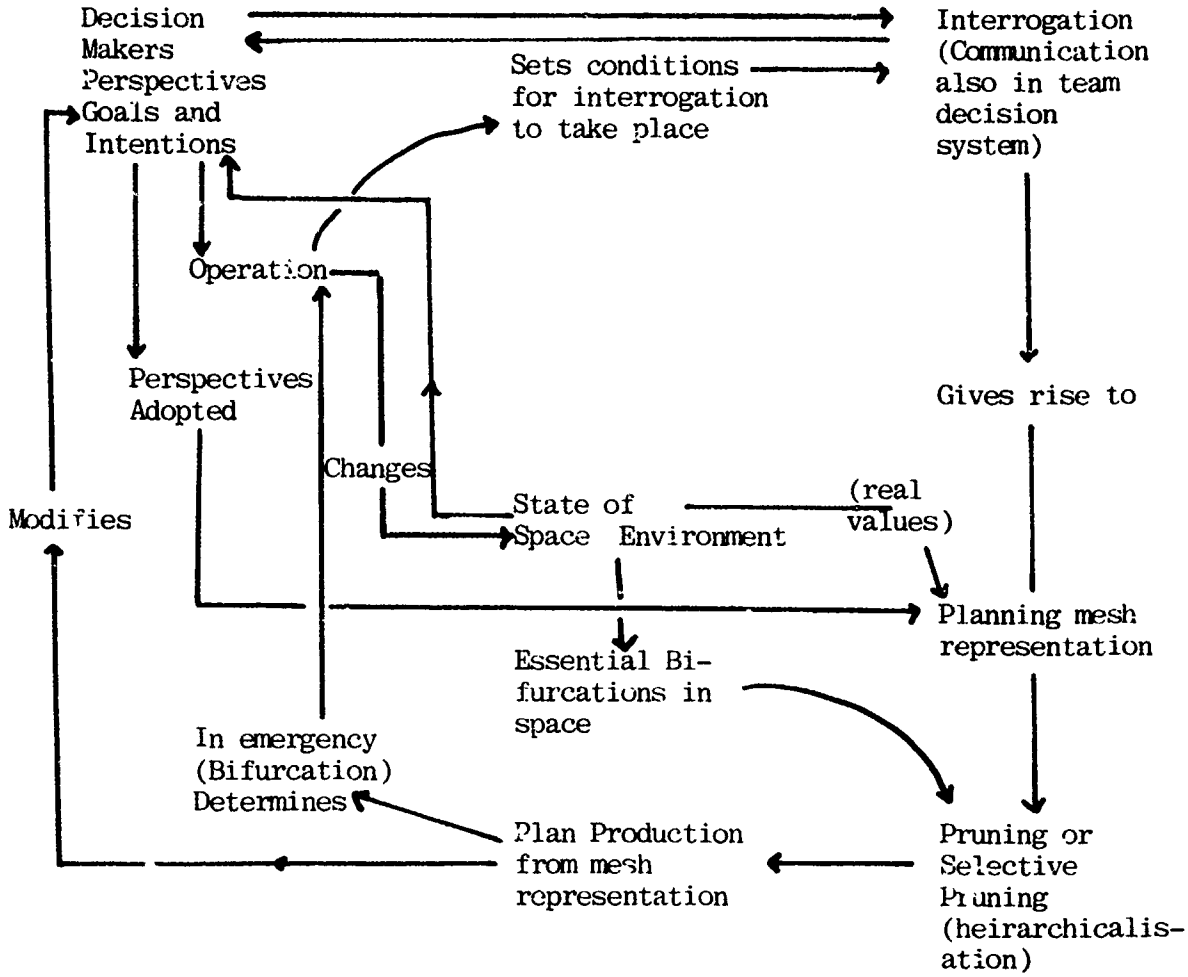


Fig 8. Idealised Configuration showing Main Interactions

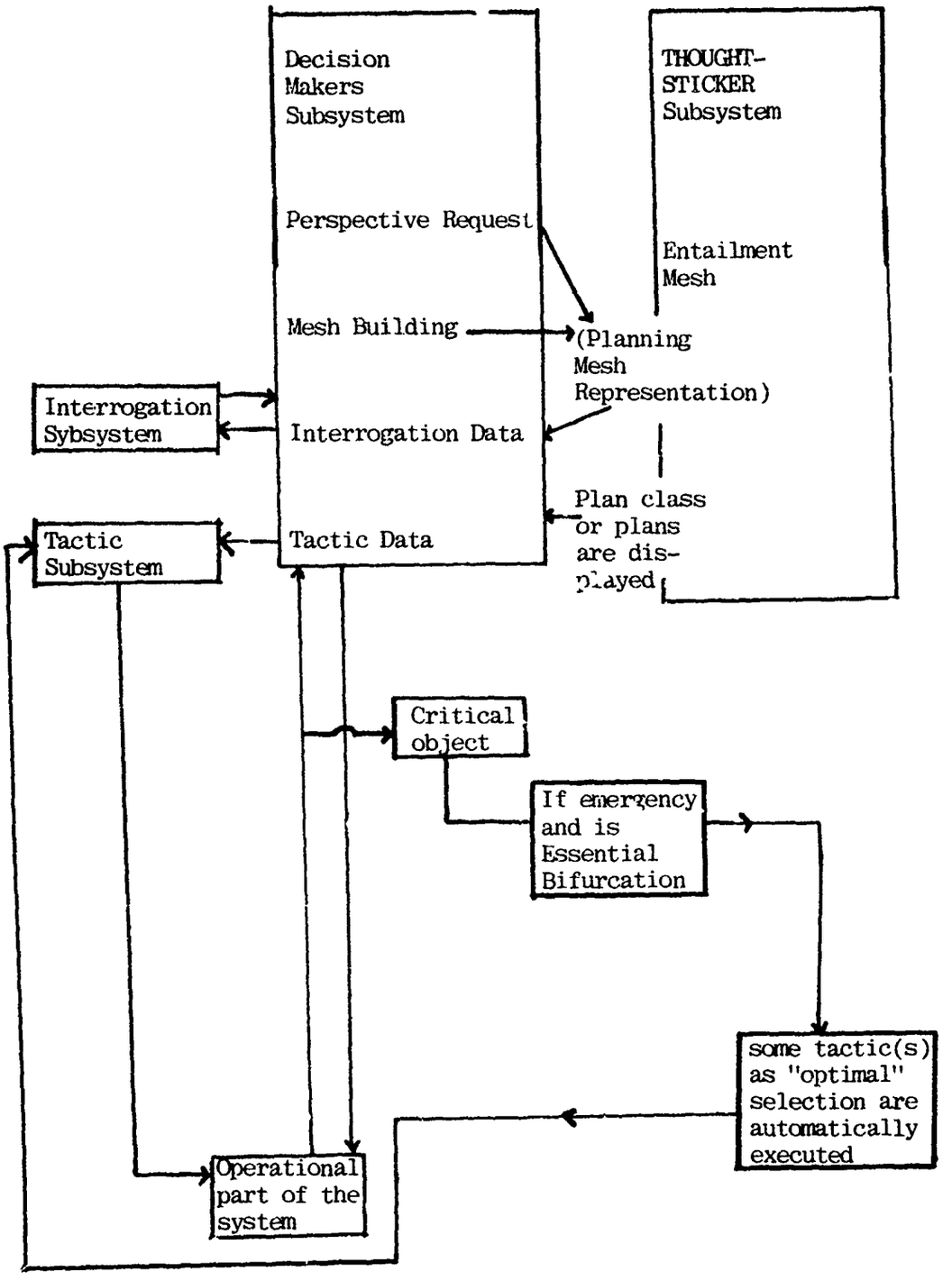


Fig 9 Some Existing Subsystems

3.3. Tactic Subsystem

To meet criticisms (a), (b), (c), (d) of Section 2.8, it is necessary to provide each subject with something, (it could be conceived, at one extreme, as a spacecraft captain, at the other extreme, as a programmable autopilot) by means of which the subjects can delegate responsibility and extend their intellectual domain into the interior of the decision system, without incurring perceptual-motor-overload.

The expedient adopted is a tactic subsystem permitting the purchase of a limited number of "tactic schemes" (in fact, 8 for each spacecraft). These schemes are BASIC expressions that operate the spacecraft and give the commands that the subject would normally have to give. One typical scheme is

"Move Spacecraft α to Starbase β eliminating Klingons en route and, in the vicinity of β, unless energy is less than ϵ in which case dock at β, and report".

Another is :

"Move Spacecraft α and Spacecraft γ to the vicinity of β repair hole at δ, unless energy is less than ϵ for either α or γ in which case report".

Energy is used, in "purchasing" and "constructing" these tactics; where "constructing" means "filling in the Greek lettered blanks", of which α and γ may be completed by X or Y (designations of the Spacecraft) β by any name of a Starbase; ϵ by an energy level, at which the tactic, if used, is terminated, and δ by a location in space. It is possible to revise these "parameters" of the tactic at the cost of "purchasing" the same tactic scheme again. Once purchased, the tactic is available for use and is initiated by a tactic command referred to the spacecraft. Use of a tactic is not cost free unless (as later) there is an emergency condition, when "no cost" execution is possible. But in any case, the cost of execution is much less than the cost of purchase.

Tactics appear in the planning mesh representation as objects and are related, in that context, to strategies (the character of which depends upon how they are related; for example, some people see Spacecraft, (also objects) as "having tactics", whereas others see "Tactics as mediated by Spacecraft").

Obviously, tactic construction is the volitional equivalent of interrogation.

Consequently, (Fig 9) there exists a means of entering tactics, either manually, or automatically, as objects with values into the planning mesh representation.

By the same token (Fig 9) data obtained by interrogation can be entered (after each interrogation session) manually or automatically, either to create objects (such as goals, intentions to do something), or else to assign current values to objects that already exist in the representation.

Finally, (though with barely adequate definition since a TV picture of up to 4 Tektronix Storage Tubes has to be displayed on a TV screen) it is possible, with delay, to present prunings (plan classes available) and plans (selective prunings), on request; this is done by taking a perspective centred upon one or more objects in the planning mesh representation.

3.4. Plan Execution

With the severe limitations just noted, the subject can ordain that any plan, so displayed, is executed. In this case, the output from the THOUGHTSTICKER system is stored and a plan, calling for tactics, information, etc, is instituted by reading off the stored data as commands (including enquiries) that are manually available to the subject.

In an "ideal" implementation, the objects (alias topics) that are components of a planning entailment mesh correspond to procedures or clusters of coherent and interpreted programs (perhaps interpreted in distinct processors) that are executed insofar as the entailment mesh representation is hierarchicalised to provide a class of plans (pruning) or one plan (a particular selective pruning of the mesh).

This "idea" is achievable though its implementation is impracticable for purely technical (and trivially technical) limitations. One, especially trivial restriction is imposed by the currently available "Free List" of LISP "Cells"; because of which meshes such as Fig 10 are discouraged (the system is able to handle meshes like Fig 11A or Fig 11B without delay apart from the turnover delay noted earlier in this report. Some prunings and selective prunings are also shown in Fig 11A and Fig 12 to illustrate the displays available to a subject or decision making team.)

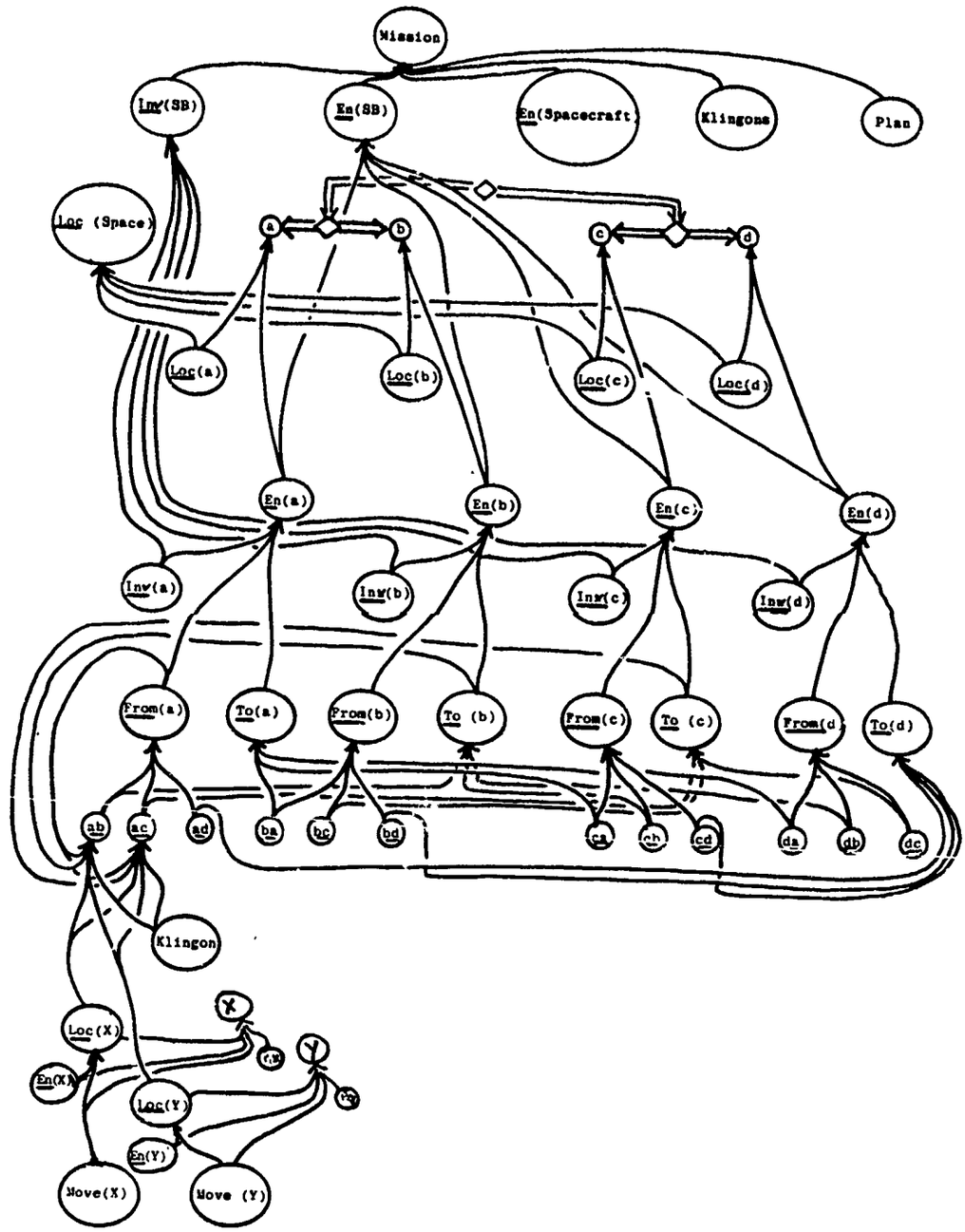


Fig 10: A fragment of very complex entailment mesh, representing Starbases and their economy in terms of trade routes as well as locations (Loc) and Investments (Inv) the trade and general economy depending upon Spacecraft and Klingons. There are virtually indefinite pr lings for the entire mesh of which only part is shown. Though describable in principle, such representations are discouraged in practice for the sake of expediency and because they are changed by cracks and holes

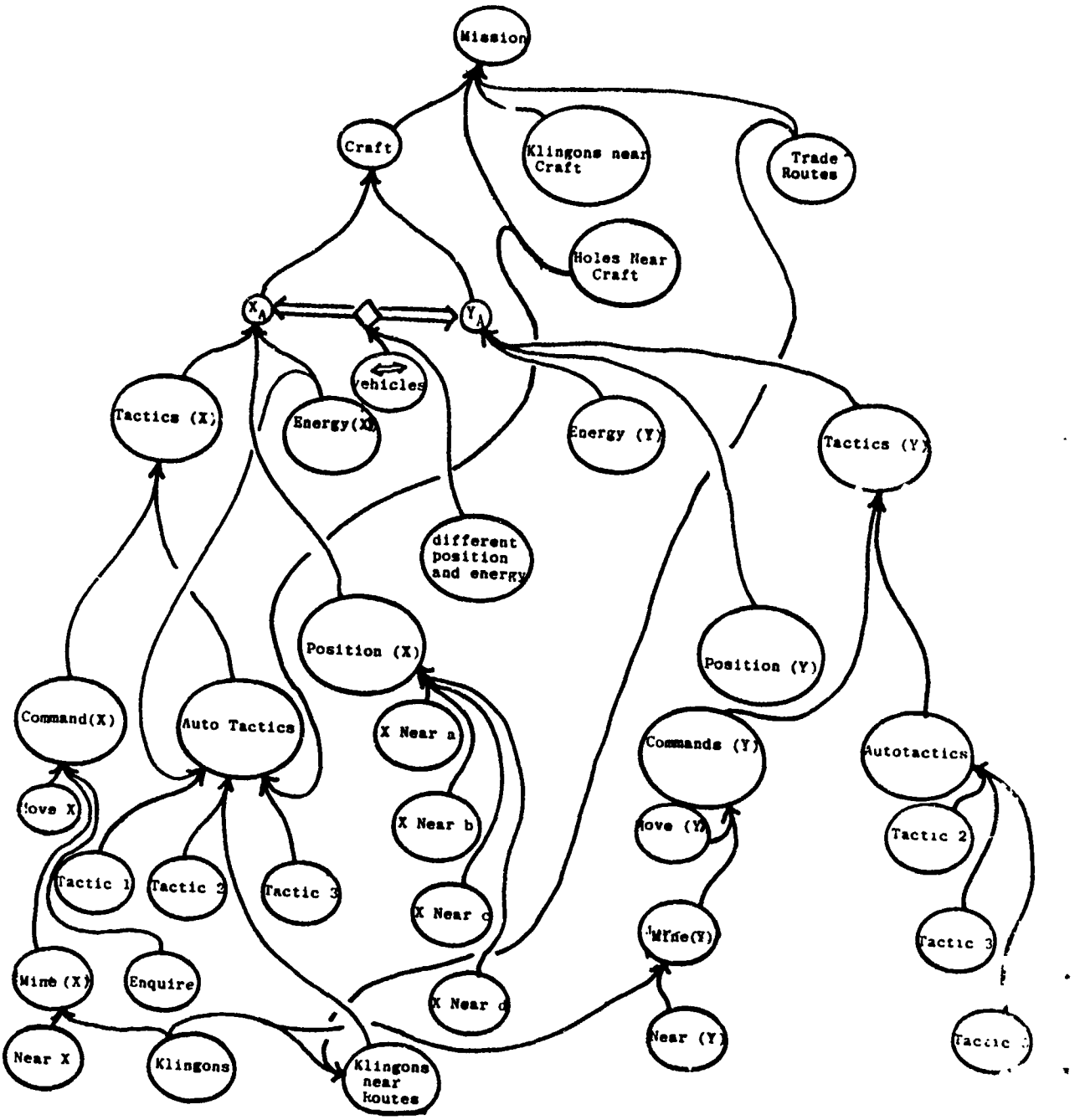


Fig 11(A). Planning Entailment Mesh Constructed by a subject regarding Spacecraft and mission as having tactics that are used by the Spacecraft in the mission.

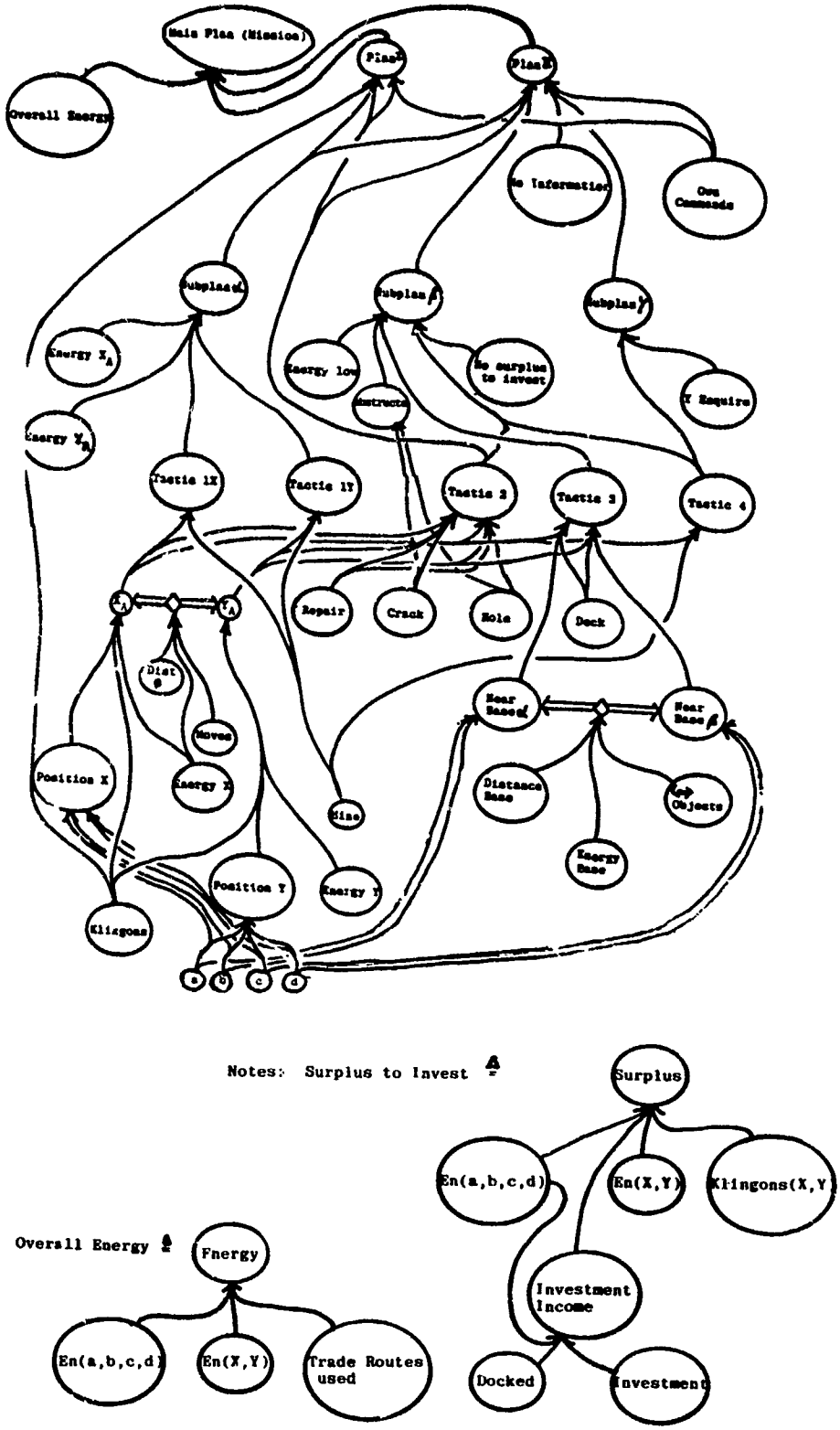
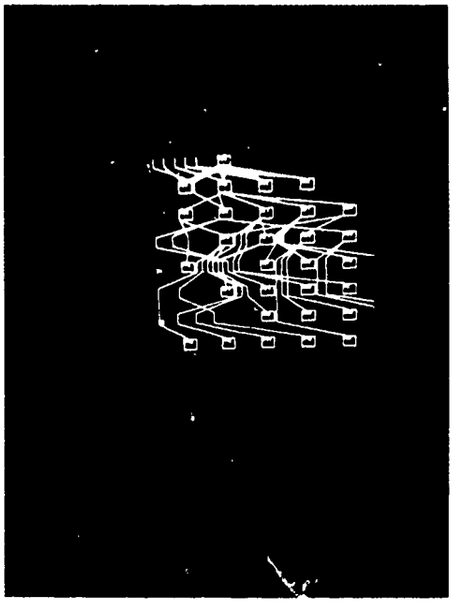
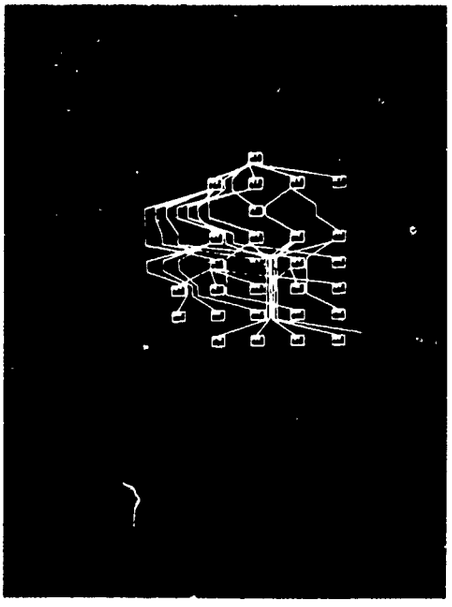


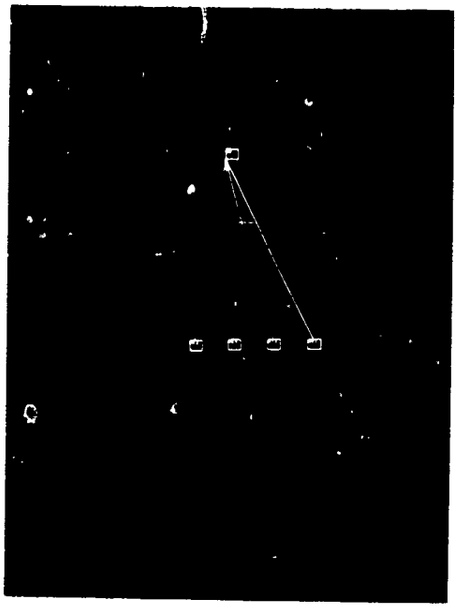
Fig 11(B) Planning Entailment Mesh Constructed by subject seeing plans and tactics as using Spacecraft for achieving goals and other objectives



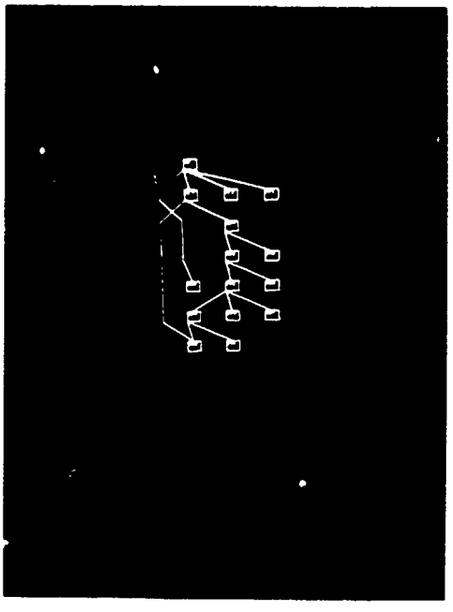
I Pruning From Node 19



II Pruning From Node 11 (Spacecraft)

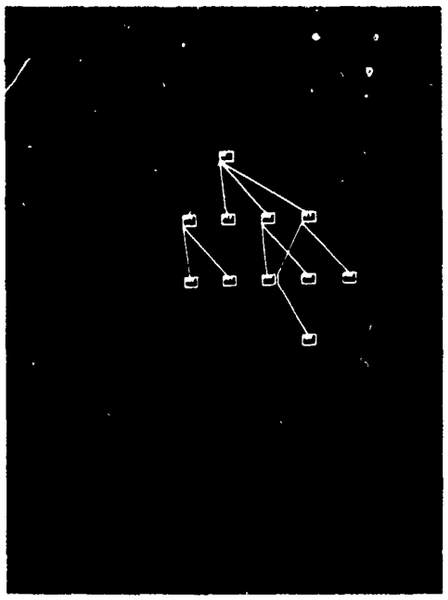


III Alternatives that are presented for selective pruning decision at Node 5 (mission)

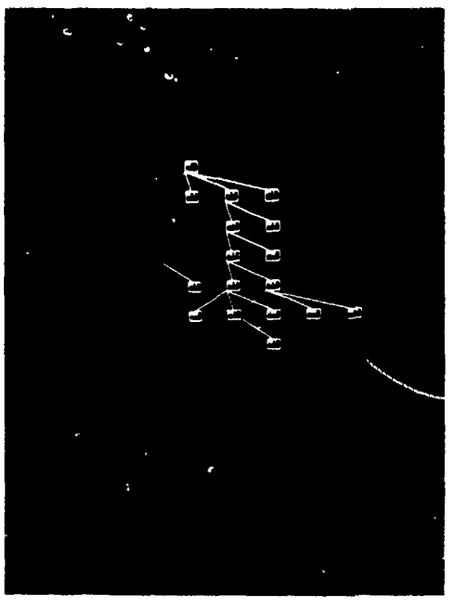


IV One derivation (plan) exhibited under Node 5 (mission)

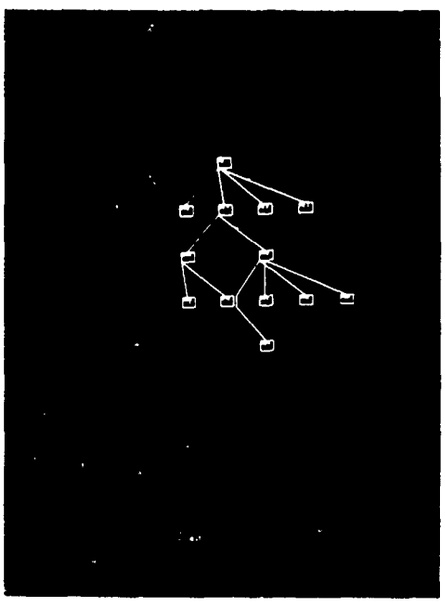
Fig 12. Prunings and Selective Prunings carried out on an Entailment Mesh of Fig 11A.



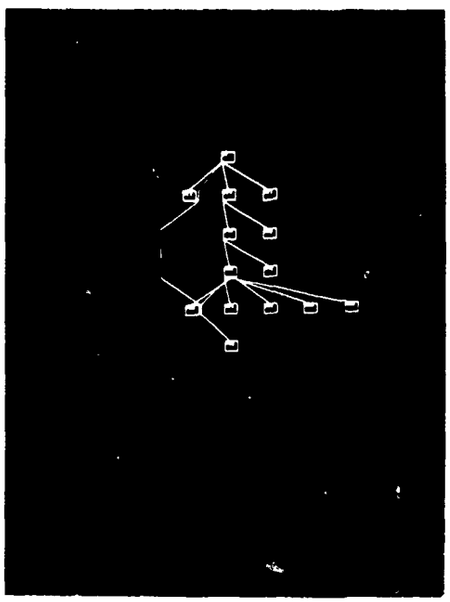
V Another derivation (plan) exhibited (selectively) under Node 5 (mission)



VI A derivation (plan) under Node 33 (autotactics and tactic set)



VII A derivation (plan) under Node 14 (Trade Routes)



VIII A derivation (plan) under Node 44 (Klingons near Trading Routes)

Fig 12. (contd.)

3.5. Operational Form

As noted in Section 2.8 (d), (f), (g) the space environment can run into difficulties manifest

(a) As changes in its topology (which may only be replaced by cooperative effort)

(b) Because of emergency conditions such as "Spacecraft running out of energy" or "Starbase running out of energy". (Topological disruptions impede trade between the Starbases; consequently, upsetting the Starbase Economy, as well as impeding the motion of Spacecraft. All unrepaired disruptions lead to an energy deficit, as in (a)).

Under these circumstances the decision makers may be able to act alone, or (in the team decision system), may act cooperatively, as a team. On the other hand, if they fail to act, or to recognise an emergency then the Starbase Economy (and the Spacecraft, which depend for energy upon Starbases), would collapse irreversibly.

Ideally, the THOUGHTSTICKER system picks up the objects in the planning mesh representation which are in an emergency condition. (Currently, there can be emergencies on the objects "Spacecraft", the objects "Starbases") and prunes the mesh, automatically, under that head (or those heads) as shown in Fig 12. An interval in which some action must occur is estimated, and the decision makers are allowed as long as possible to express preferences over the displayed plans of action; but at some crucial point the computer aspect of the system loaded with whatever human thoughts and deliberations have been externalised at this stage, takes over and initiates the plan, or plans, automatically. For the human beings, can, at this juncture, do nothing.

As it stands, this arrangement is currently too unreliable (though, as noted in Section 3.2, a working demonstration exists) so that, as a compromise, the subject is offered as much choice as possible amongst his purchased and constructed tactics after which the tactics (if they exist) are automatically executed.

These comments give realism to some of the salient features, namely

(A) That there is an ongoing general decision process implicating both the subjects and the complete individual or team decision system. Decisions of this kind are due to general conceptual operations, to learning about the space environment for example, or learning how to make plans that do not incidentally disrupt the space environment.

(B) Insofar as there is an emergency there is an essential bifurcation and the distinction created must be resolved whether by one decision maker, or the other or by the team, or by the system of which they are part.

Both in terms of (A) and (B) decision making is attributable to the entire system; it is, in general, distributed and cannot, usually, be localised in some component of the system.

In this sense, also, decision style is a systemic property. Individual differences in conceptual style and possibly, in preferred heuristics are valuable predictors of performance. "Individual Differences" in Decision Style (in the present sense of Decision) may exist, but the use of "Individual Difference" in this context leads to a serious question, of what, exactly, the "individual" is; the person?, the perspectives?, the team?, or "the system"?

4. An Account of the Existing Team Decision System

The overall configuration of the currently existing team decision system is shown in Fig 13 and its concrete appearance in Fig 14, Fig 15, and Fig 16. As a team system both cabins are used simultaneously, but the system can also be used individually (for one individual at once), when only one cabin is occupied. The captions of Fig 14, Fig 15 and Fig 16 are self explanatory (for example, the computers employed, the special purpose and standard hardware, the task as it is seen by a subject).

The subject(s) in the team decision system are called commander(s) A, B, of spacecraft X_A, Y_A and X_B, Y_B, and they occupy the role of mercenaries who are hired by a community of 4 starbases, a, b, c, d, located at different points in space.

4.1. Basic Dynamics

Each starbase has an economy, using a common monetary unit, "energy". For any starbase, i = a, b, c, d the Energy (i) has an initial value subject to an exponential degradation. Units of Energy (i) are gained insofar as trade takes place by the passage of ladened freighters along designated trade routes, with another starbase $j \neq i$. The safe arrival, at i, of a freighter from $j \neq i$, or, conversely, the safe arrival at j of a freighter from i increments Energy (i), so that, in the absence of interference, and with a given freighter transmission schedule, Energy (i) would increase, asymptotically to a (high) limit, set by the exponential degradation.

The trade routes available, for an (initial) torroidal connectivity of "space", are shown in Fig 17, together with the disposition of Starbases.

For any i the value of Energy (i) is decreased instantaneously by a payment, called "refuelling", to a Spacecraft X_A, Y_A; X_B, Y_B, which exist with an initial fuel (in energy units) namely, of Energy (X_A), Energy (Y_A) Energy (X_B), Energy (Y_B) which is marginally sufficient for maintenance and movement of a Spacecraft. It is crucial in this construction that Spacecraft must move. They are not able to remain stationary, (or, as a general rule, to exist without energetic cost) unless they are docked at a starbase . To complete the picture notice that if the starbase trade were uninterrupted there would be no point in employing spacecraft (ie. in refuelling them Fig 18).

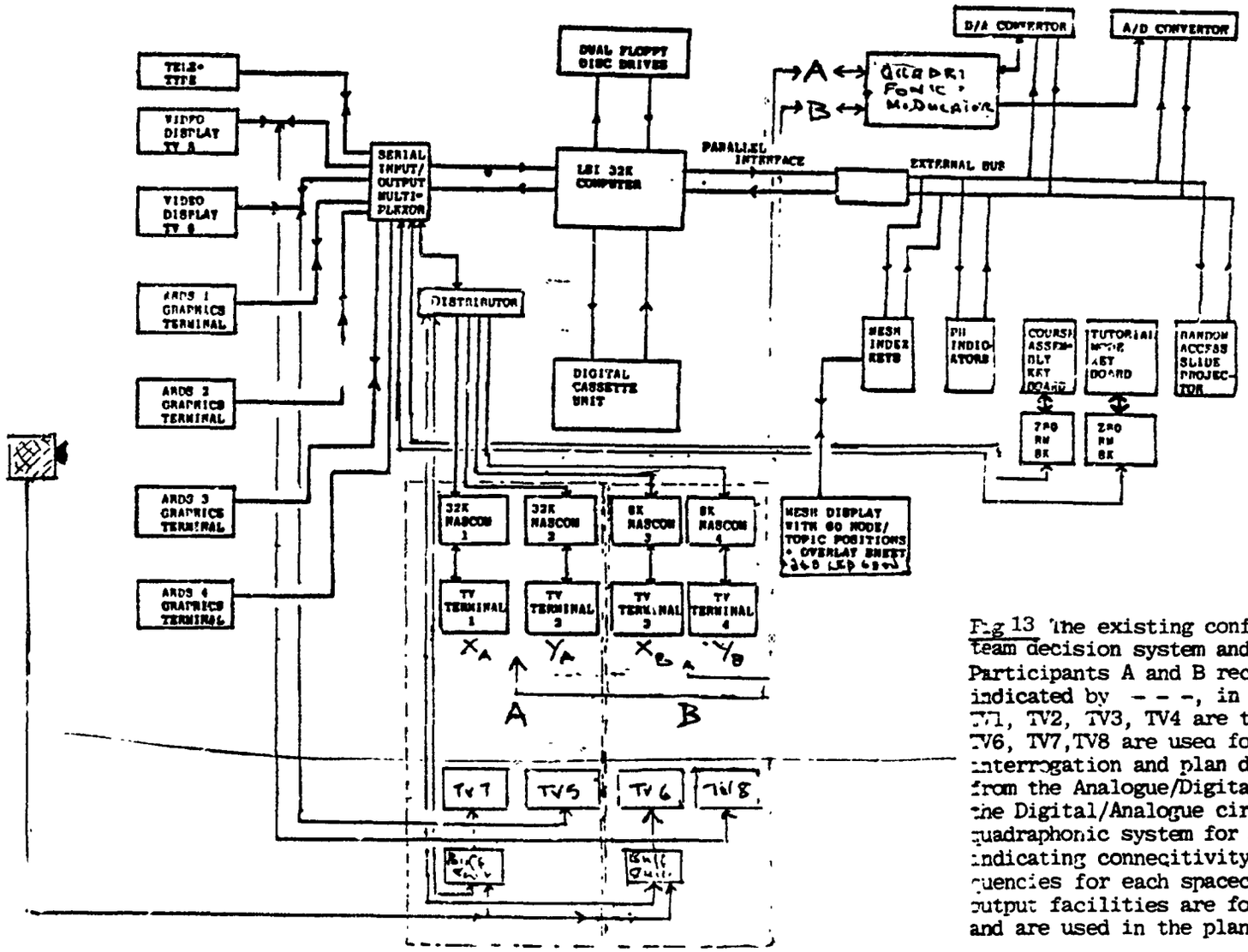


Fig 13 The existing configuration of the team decision system and of THOUGHTSTICKER. Participants A and B receive displays, as indicated by - - -, in different rooms. TV1, TV2, TV3, TV4 are the spacecraft, TV5, TV6, TV7, TV8 are used for enquiry, for interrogation and plan display. Inputs from the Analogue/Digital and outputs to the Digital/Analogue circuit form the quadraphonic system for guidance and indicating connecitivity (distinct frequencies for each spacecraft). Other input output facilities are for THOUGHTSTICKER, and are used in the planning session only.

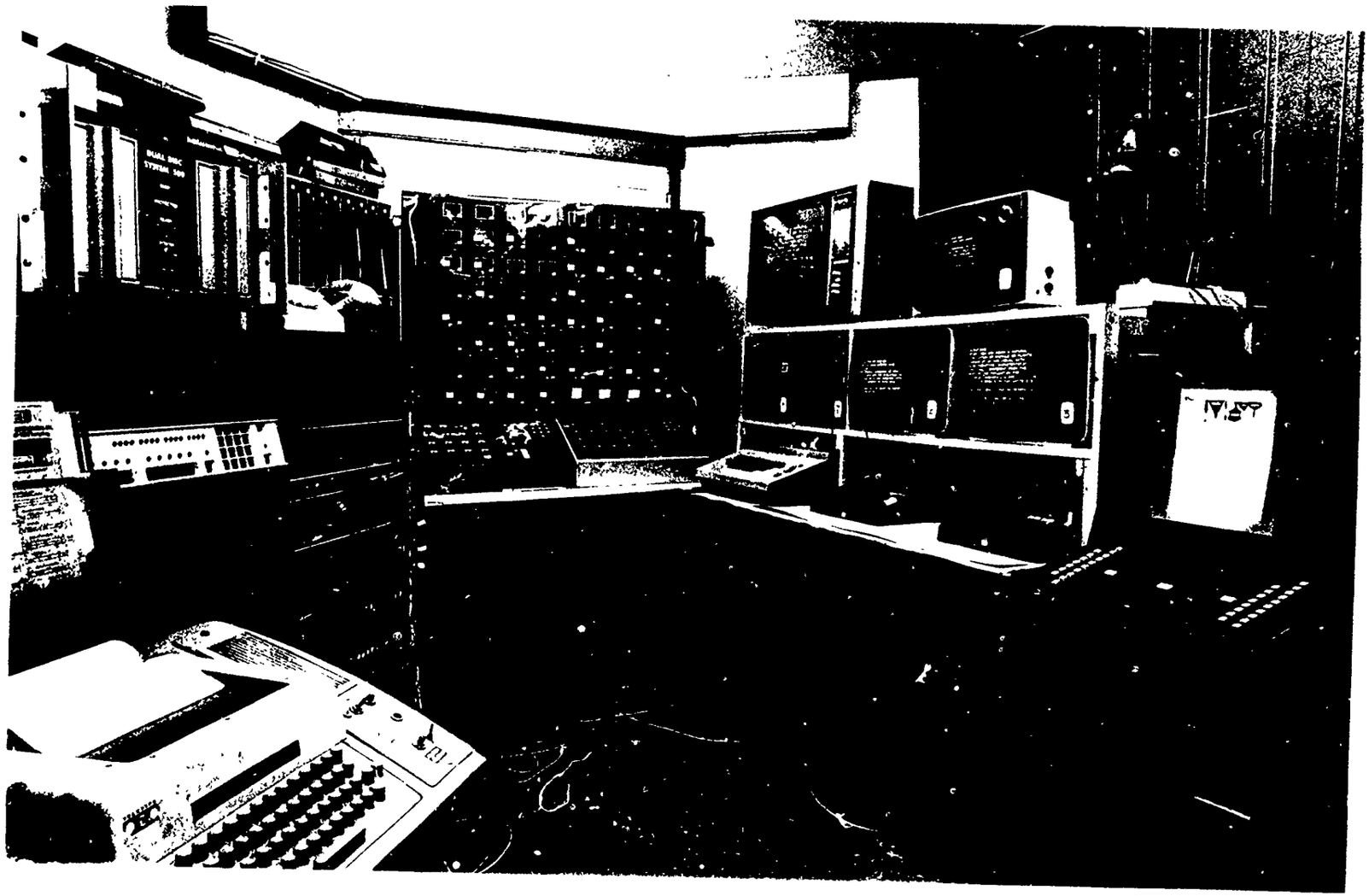


FIG. 11 The THOUGHT TICKLR System (key over)

A = Random Access slide projector with control keyboard, for displaying slide mounted graphics

B = Entailment mesh display with overlay sheets, containing 60 node positions and 4 x 60 independently addressed coloured signal lamps

C = Output Mode keyboard with special function keys

D = Plan Authoring keyboard with special function keys.

E = ARDS Graphic Display tubes with control unit and keyboard used for displaying 'pruned' meshes

F = Video display units with control keyboards used for tactic/text input/output

G = Pigeon holes filing system with slots for 60 files and containing 3 x 60 independently addressed signal lamps

H = Dual drive floppy disc unit

I = CAI 32k computer

J = Digital Cassette unit used as progress logging device

K = ASR 33 Teletype used for hard copy output

L = Electronics Rack containing special electronics, micro-machines, and system interface

Key to Fig 14 . The THOUGHTSTICKER System

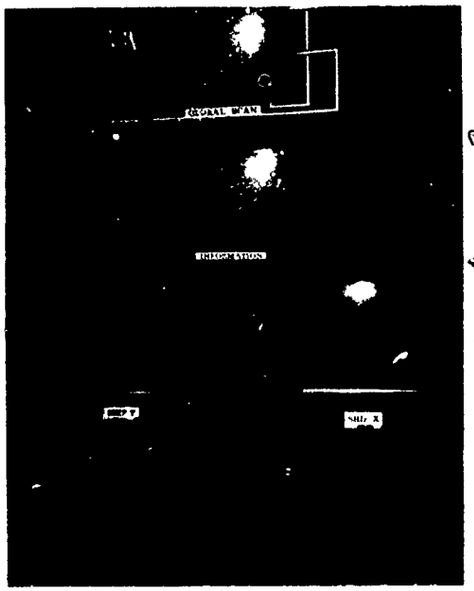


Fig 15: Commanders Cabin

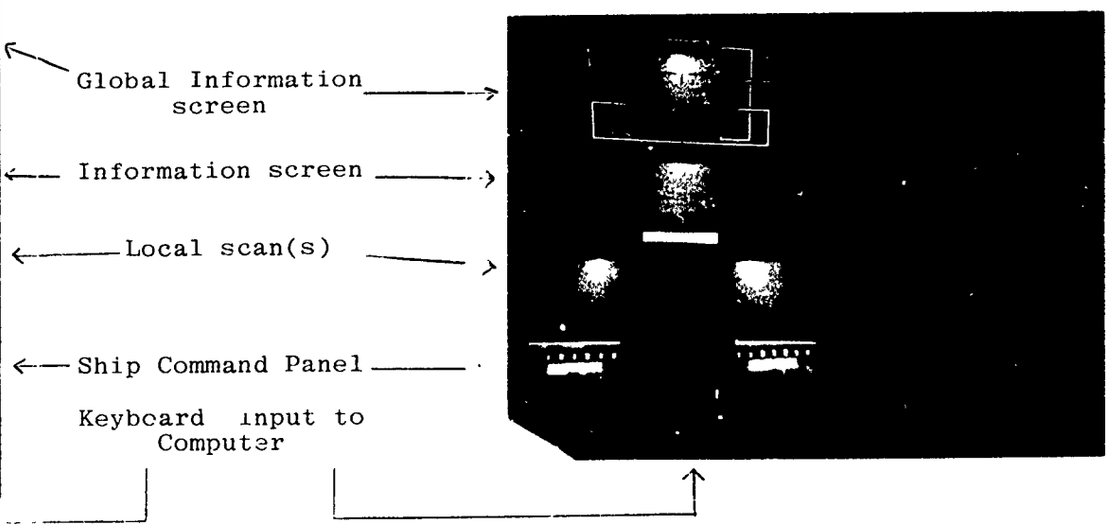


Fig 16: Commanders Cabin

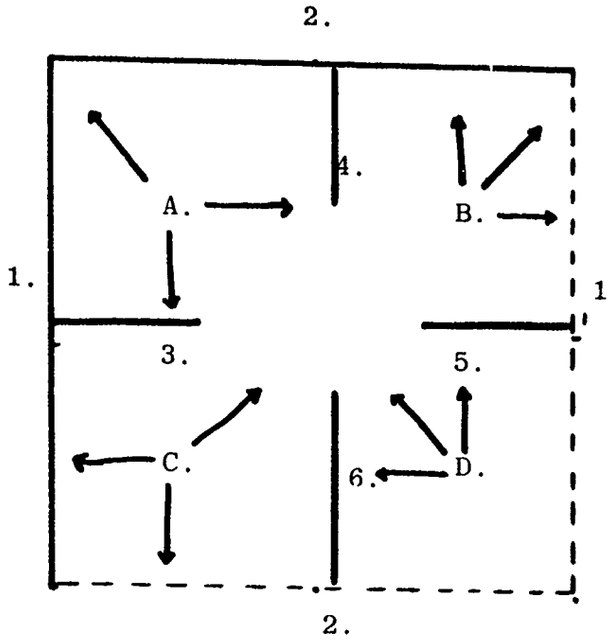


Fig 17

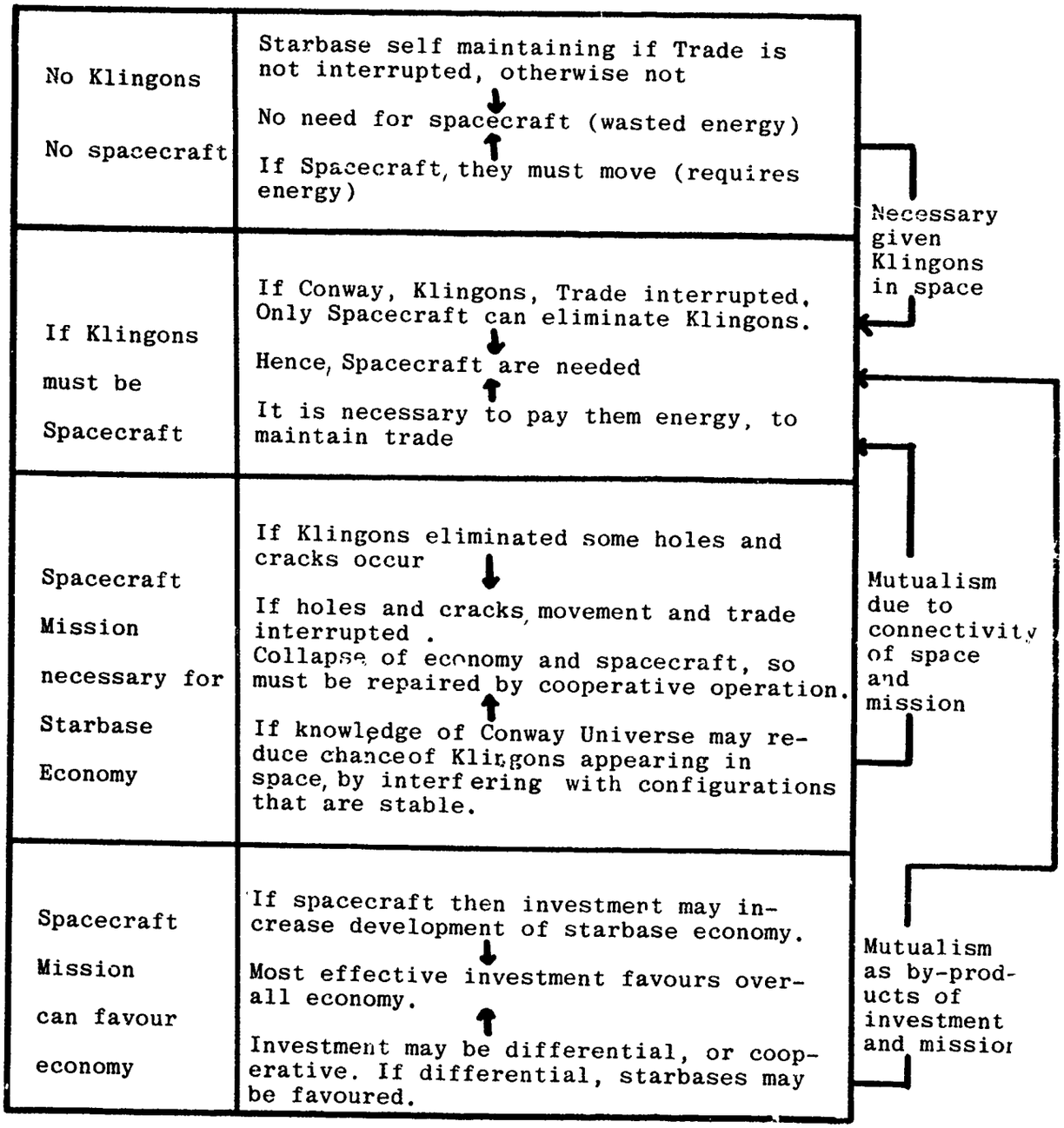


Fig 18 Balance of forces, need for spacecraft Mission. Mutualism due to connectivity and Mutualism, due to an investment plan, between Spacecraft and Starbases

As it is, space is perturbed by marauding Klingons. These are generated (in "inner space") by a deterministic system; a Conway tesselation automaton, having tesselation cells in one-to-one correspondence with points in space. Although, at any generation in the development of a Conway automaton, the numerical value assigned to a tesselation cell is 1 or 0, there is a counter, at each cell, registering the number of generations for which this cell has assumed "state 1", without interruption, (any interposed "0" value). If age (cell) exceeds a limit of 5, then a Klingon is generated, at the one-to-one corresponding point in space, and remains in position unless it is eliminated.

Klingons attack freighters (removing their contents) and leach energy from Starbases and Spacecraft. They may only be eliminated if a mine is place in their vicinity, with specified energy value, by a Spacecraft. The energy dissipated by a mine is accumulated by all Klingons in a given region at a fixed absorption of energy, the Klingon is eliminated and the Conway Tesselation cell (greater than or equal to age 5) is set, as a result to state 0. This event may accidentally or (given knowledge of the Conway system), intentionally, disrupt the stable configurations that are replicated on the Tesselation Surface.

Because Klingons perturb space, and because Spacecraft are needed to get rid of them, it is worth paying for their services. The Starbase Economy without Klingons would have increasing energy. In the presence of Klingons, the system parameters are chosen so that it would collapse, as an Essential Bifurcation in the dynamics, before a particular number of Conway generations (in fact, about 50 of them); Fig 18.

4.2. The Mission

The mission of the mercenary Spacecraft commanders is to protect trade between the Starbases. The energy needed to refuel a Spacecraft is obtained by docking the Spacecraft, at a Starbase.

As part of the docking operation, the Spacecraft commander is offered the possibility of investing spare energy (if any), in the government and real estate of the Starbase. Investment cannot be withdrawn until the end of the mission, and disappears if the Starbase is at energy zero (emergency) condition. If not, an investment is incremented at a rate proportional to Energy (a), Energy (b), Energy (c), or Energy (d), depending upon which Starbase (a, b, c, d) is selected for docking and (possible) investment.

The energy of the spacecraft is decremented by movement, by positioning mines, and by information search. The set of enquiries and commands that are available to a commander is shown in Fig 19 and typical displays are shown in Fig 20 and Fig 21. One command (repair) and one constituent of the global scan or local scan display (holes and cracks) require explanation.

If a mine is exploded to eliminate one or more Klingons in a neighbourhood, it is possible to rupture the environment by forcing a "hole" in space which is impenetrable, either by trading freighters or spacecraft. If a "hole" is made in the neighbourhood of displayed "lines of weakness" in space, the environment is "cracked" (the entire connectivity of space, originally torroidal, is disrupted to produce cylinders, planes, or even half and quadrant planes). Such alterations reduce the freedom of navigation of spacecraft and the conduct of trade by freighters plying between the starbases and supporting the starbase economy. As shown in Fig 22, the production of cracks necessarily blocks one and usually blocks several trading routes.

If "cracks" exist for a prolonged interval, they necessarily lead to an emergency on one or more of the starbases (a low energy condition); so, also, may the prolonged existence of "holes" on a trade route.

Both "cracks" and "holes" can be repaired by a "cooperative" action. "Hole" repair involves "cooperation" between any pair of spacecraft X_A, Y_A, X_B, Y_B (as, for example, both of A's spacecraft or both of B's spacecraft). In contrast, "crack" repair can only take place as a result of "cooperation" between A and B, since repair is affected only by

$$X_A, X_B; X_A, Y_B; Y_A, X_B; Y_A, Y_B$$

4.3. Rationale Behind the Discontinuities

In summary, there are two kinds of discontinuity built into the mission carried out by the mercenary commanders. One of the two (investment) can be held to favour competition between the mercenaries, since it induces not-necessarily-shared assymetries, in the starbase economies. So, for example, commander A might invest in starbase b, and commander B in starbase d perhaps differentially supporting the trade routes profitable to

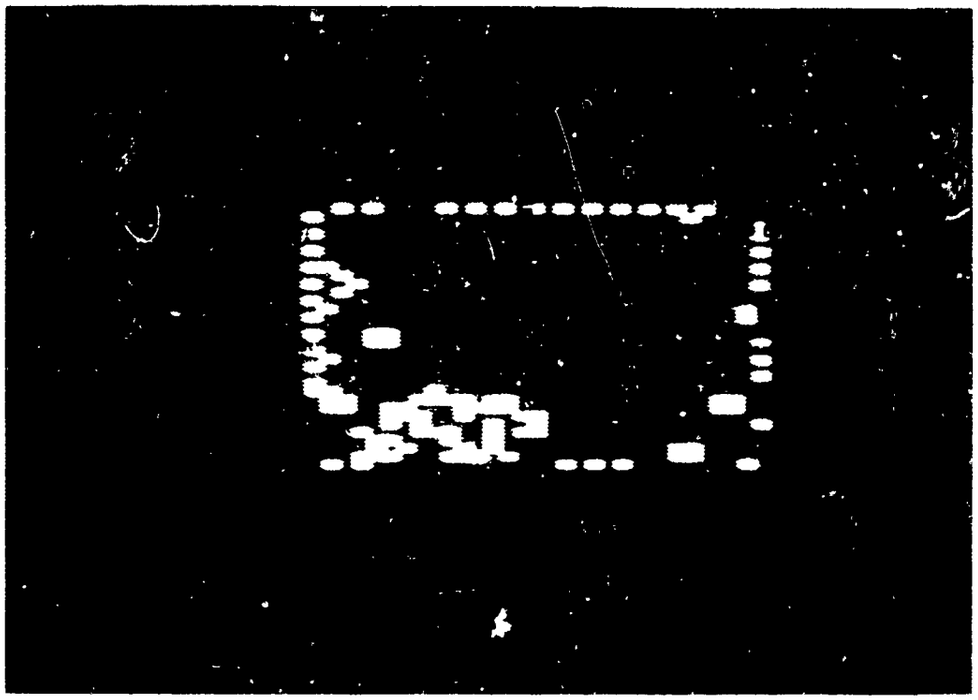
Commands

Function	Ship X printout legend	Ship Y printout legend
Move	M	1
Scan	S	2
Repair	R	3
Destroy	D	4
Communicate	C	5
Information	I	6
Tactic	G	7

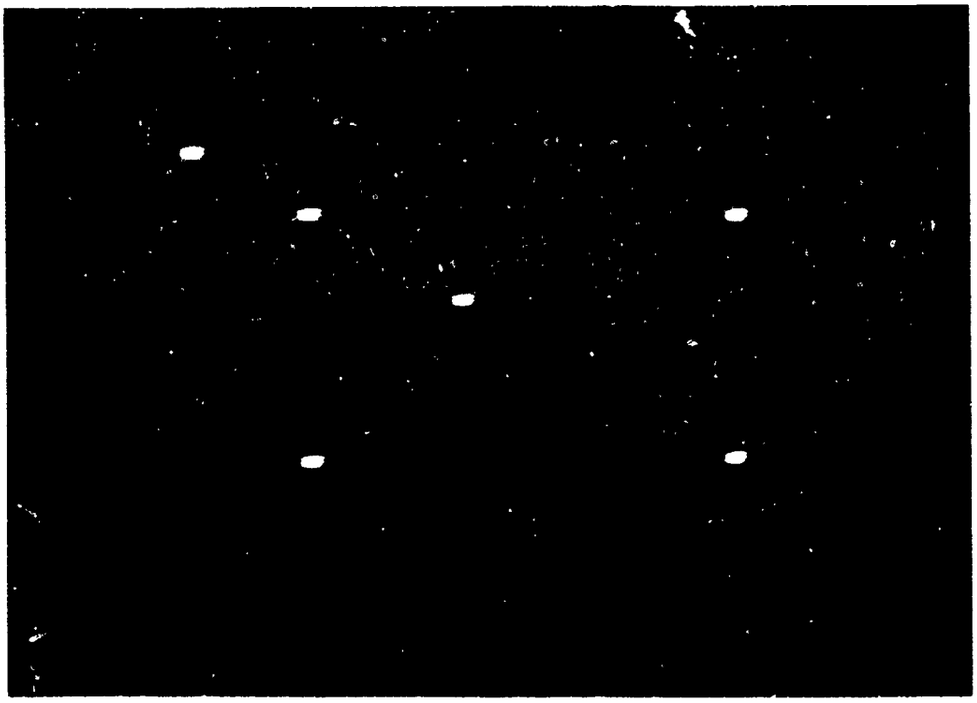
Information List

Function	Printout legend
Global Scan of Position of:	
Freighter	1
Ships and Bases	2
Klingons	3
Holes	4
Cracks	5
All objects	6
Several Successive views of:	
Inner Space	7
List of Current:	
Base energies	8
Total of:	
Trade(s) blocked	9

Fig 19

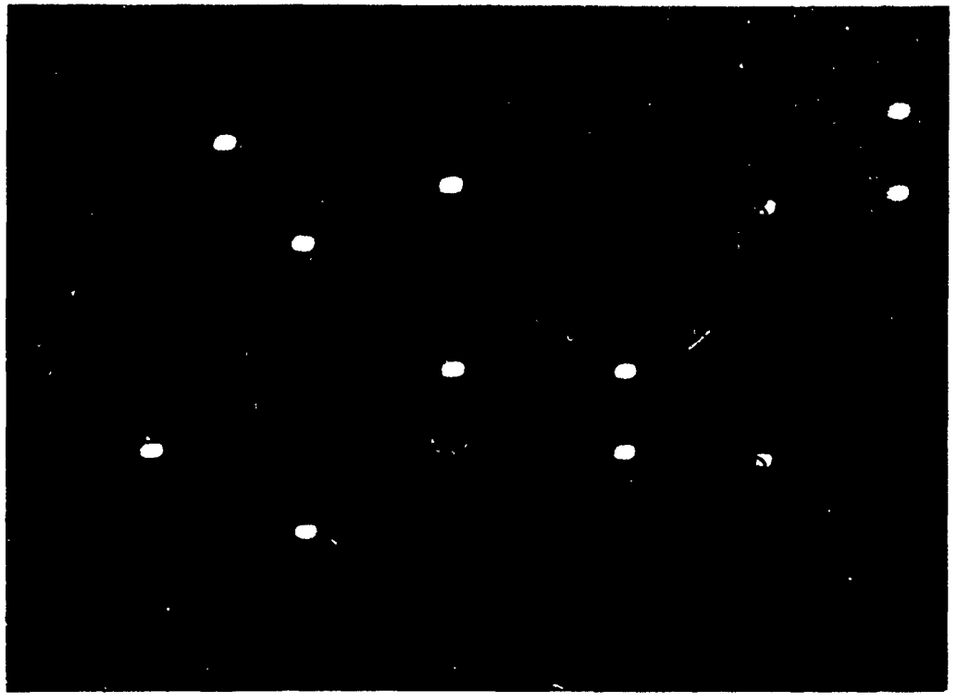


Inner Space

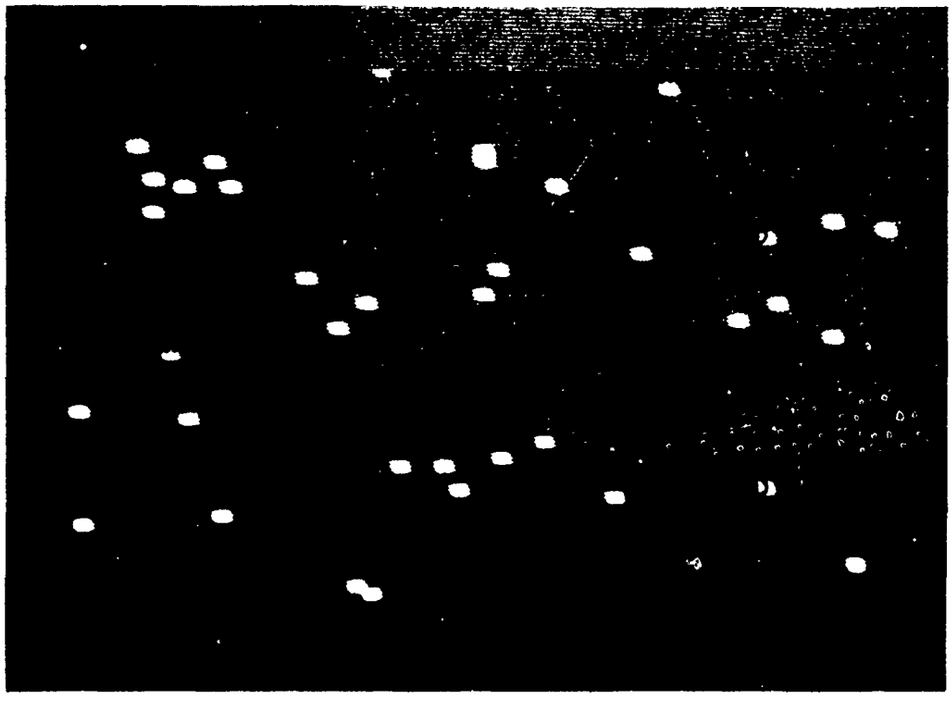


Ships and Bases

Fig 20. Typical Displays



Freighters



Klingons

Fig 21: Typical Displays

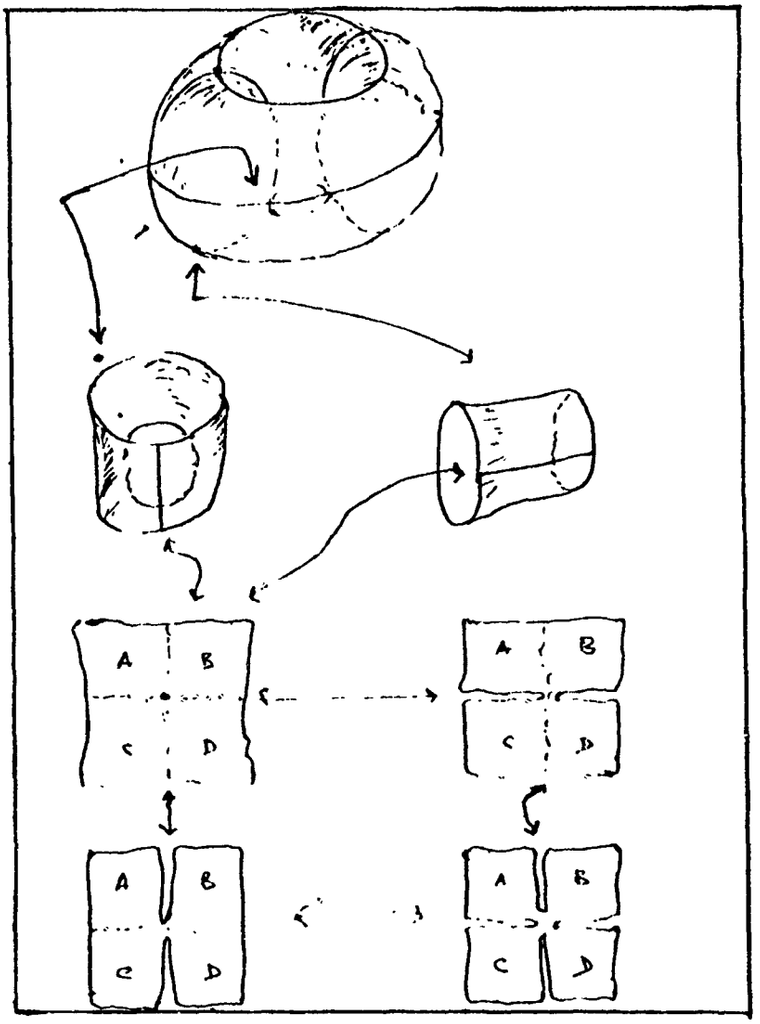


Fig 22: Space Intact and with various cracks in it

Trade routes obstructed by cracks (routes are coded on records as 1 to 6)

A. B →	C. A ↓
A. C ↓	C. B ↗
A. D ↖	C. D ←
B. A →	D. A ↖
B. C ↗	D. B ↑
B. D ↑	D. C ←

these starbases. Of course, the competition need not take place, but even if it does so, it can be quite compatible with the conduct of the mission. The other discontinuity is hole and crack prediction and these events favour distribution of control (hole repairing activity) or overt cooperation (crack repair, as a result of conjoint actions by A's spacecraft and by B's spacecraft). If the mission is satisfied and the starbase economy thrives, some distribution of control and some cooperation is necessary.

It could be arranged, (though, in fact, it is not so arranged), that investment is a mandatory prerequisite for maintaining starbase economy. It is arranged, by the coupling between the Conway Tesselation automaton, and the production of Klingons, that cracks and holes occur and that their repair, sooner or later, is necessary for a viable starbase economy (Fig 18).

4.4. Quadriphonic Sound Spatial Location

In order to provide the commanders with gross spatial information about their global positions, each starbase emits a beacon signal, having an amplitude proportional to distance. Two frequencies are used to identify the two spacecraft of each commander, and the distance measure is actual, ie. the appearance of cracks will change the signal suddenly.

4.5. Insurance Value and Tactics

The spacecraft may be individually manoeuvred either one at once, or jointly. They may also be manoeuvred by restricted programs or tactics (Section 3) that are executed upon request. By this means, the mercenary commanders can offload the chores of navigation and the details of Klingon elimination, and do so according to their own taste in the matter. Consequently, tactic specification and tactic execution are means for exteriorising thoughts and plans, albeit, in a restricted manner.

Each spacecraft has 8 tactic schedules, any or all of which may be purchased by a mercenary commander. Purchase of a tactic schedule is accompanied (as part of the transaction) by filling in the values, and names, of variables (to this extent, specifying the tactic for which the schedule is a skeleton, or scheme).

Any tactic which is purchased (and specified) for a spacecraft may be executed to control this spacecraft. Under normal conditions execution has a cost (in energetic

units debited to the spacecraft), but the cost of execution is much less than the purchase cost. Under emergency conditions, (an emergency is signalled on any or several of the 4 starbases and the 4 spacecraft) tactics may be executed free of cost (hence, the very real insurance value of having tactics to execute, if, for example, the spacecraft energy is low). In particular, the tactics are the only way out of essential bifurcations.

Either none, one, or both of the spacecraft of a commander may be controlled by tactics, at a given instant.

4.6. Some Comments on Learning

As noted in Section 2, the most studies of business gaming, space gaming, and the like, suggest that subjects learn chiefly behaviours and ploys, over and above an initial learning phase, concerned with the procedures needed for response and for manipulating or accessing parts of the system. Subjects seem to learn little about the underlying principles of the environment, and little or nothing about their mission.

There may be many reasons for this lack of learning; for example, that the underlying principles are set out as a difficult-to-comprehend equations (typical in economic simulations), or that there is little to be learned about the mission performed.

In the current system, it is safe to say that subjects do learn a great deal about their mission, and also learn a very idiosyncratic image of the main operating principles of the space environment.

The common feature of all the personalised images is that they are centred upon bifurcations, and the circumstances that lead up to them. Surely, the team decision system is engineered so that salient events are placed in register with bifurcations, where general decision is required. But so is a real life mission.

4.7. Character of Interrogation Sessions

Interrogation sessions (Section 3) are conducted through the central keyboard, and the central display screen at instants when the blocks of question forms have been filled. The interrogation session is started at the same time for both commanders, and question

answers are self paced but obtained within a fixed interval, after which a "must respond" message is presented. If there is a response within 5 secs after the "must respond" message a question is answered NA automatically. Similar comments apply to the confidence estimate response, accompanying all questions, except that a 0 is printed, in place of NA.

Backup (serial) versions of these programs are shown in Appendix 7 (Conway Universe) and in Appendix 8 (Team System).

4.8. Construction of Planning Mesh

Planning meshes (Section 3) are, at the moment (and not altogether satisfactorily), built up using the THOUGHTSTICKER system in a different room. As commented in Section 3, it is desirable to integrate planning mesh construction with interrogation.

5. Preliminary Findings, Subjects Used, and Data Currently Recorded

Apart from pilot study subjects and visitors to the laboratory, 12 subjects have assumed the role of commanders for the minimal experimental run (training session, one person operation for two or more sessions, as members of a team, two person operation, for one or more sessions). Team data is thus available for 6 teams made up of previously experienced commanders (one person operation). In addition there are some valuable one person records for subjects unable to act as team members. The 1 person sessions usually last for 3 hours or so (the shortest is 2 hours), and the team sessions occupy between 3 and 4 hours. Hence, there are approximately 80 hours of 1 person records and about 26 hours of team records.

For individual sessions, the task is continued until interrogation No 16 unless there are irreversible emergencies (rendering the mission unattainable).# For team sessions, unless terminated at an irreversible emergency, the sessions are continued until interrogation No 12.

The recording may, in principle, be a complete trace of events. Since it is intended to modify various features of the system, it was decided to condense the data from the present, adequate, but open-to-improvement system before entry on a disc. Event summaries and order of occurrence are picked up at the beginning of an interrogation and recorded in format before the interrogation questions for a particular interrogation (together with replies or responses). The formats are shown in Tables 6, 7, 8, 9, 10 and Table 11, using which it is not difficult to interpret the eight records at the end of this section of the report, that are used to exemplify the data.

One subject record which terminates at interrogation Session 14 in fact continued until Session 16 but data files were accidentally erased from this point onwards.

Energies in "Energy Units"
Investments in "Energy Units"
Dichotomous Events, (O, 1)
Numbers, the numerals
Command Codes (distinct for Spacecraft X and Y) are

	Spacecraft X	Spacecraft Y
Move	M	1
Scan	S	2
Repair	R	3
Mine	D	4
Communicate	C	5
Information	I	6
Select or execute tactic	G	7

Information obtained as a result of enquiry on the global scan display and at cost in energy is

Freighters	1
Spacecraft	2
Klingons	3
Holes	4
Cracks	5
All objects	6
Base Energies	7
Inner Space	8

Question Responses NA = No reply, Y = Yes, N = No, Text = Message
Confidence Estimates, Numerals, 0 to 9.

Table 8: Values of the Recorded Variables

No. Q Form	Argument Q Form	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Klingon in Scan	3	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0
2	Klingon in Scan	2	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0
3	None	1	0	0	0	0	1	1	0	0	0	2	0	2	0	0	0
4	Energy Leach	4	2	0	2	0	2	0	0	0	0	0	0	0	2	0	0
5	None	5	0	0	0	0	3	2	0	0	0	3	0	0	0	1	0
6	None (Q Blanks)	0	3	2	0	0	0	3	0	0	0	0	0	3	0	0	1
7	Klingons	0	0	3	0	0	4	0	0	1	0	0	1	0	0	2	0
8	Mine or hole	0	0	0	3	2	0	0	1	0	2	0	0	4	0	0	0
9	Mine, Crack or hole	0	0	0	0	3	0	0	2	2	0	0	2	0	3	0	0
10	None	6	0	0	4	0	0	4	0	3	0	0	0	0	4	0	0
11	None	0	4	0	5	0	0	0	3	0	3	0	0	0	0	0	2
12	None (Q Blanks)	0	0	4	6	4	0	0	0	4	0	4	0	0	0	3	0
13	None	0	5	0	0	0	0	0	4	0	0	0	3	0	0	0	3
14	None (Q Blanks)	0	6	5	7	5	0	5	0	0	0	0	0	0	0	4	0
15	Enquiry, or Invest or Tactic Use	0	7	6	8	6	5	6	5	5	4	5	4	5	5	5	4
16	Enquiry	0	0	7	0	7	0	0	C	0	5	0	0	0	0	0	5
17	None (Q Blanks)	0	0	0	0	8	0	0	7	6	0	6	0	0	0	6	0
18	None (Q Blanks)	0	0	8	0	0	9	6	0	7	6	0	5	0	0	0	6
19	None	0	0	0	0	0	0	0	0	8	7	7	0	6	6	7	7
20	Global Scan	0	0	0	0	0	0	0	0	0	8	8	6	7	7	8	8
21	Klingon in Scan	7	0	0	0	0	6	7	0	0	0	0	0	8	8	0	0
22	Klingon in Scan	8	0	0	0	0	7	0	8	0	0	0	7	0	0	0	0
23	None (Q Blanks)	0	8	0	0	0	8	8	0	0	0	0	8	0	0	0	0

Table 9. Question Form Matrix relating question forms to interrogation lists (of Fig 7) rows; question forms 1-23. Columns stand for interrogation session 1-16 and the entries in each cell are an order number 1st to 8th in relevant 8 item question list "Arguments" are the events (other than "Blanks" (Fig 7) in question form) required to ask the question. Alternative question forms are shown (numbered in register with this matrix) in Tables 10 and 11.

NOTE: Interrogat Session responses are condensed for recording onto distinct page. For individual operation responses are in numerical order as obtained . For team operation A's response is recorded and followed immediately (on next line) by B's response

1 HOW MANY KLINGONS DID YOU ENCOUNTER?

2 HOW MANY KLINGONS DID YOU ATTACK?

3 HOW MANY KLINGONS DID YOU DESTROY

4 HOW MUCH ENERGY DID YOU LOSE TO KLINGONS ?

5 A)WHAT IS THE ENERGY OF SPACESHIP X?
B)WHAT IS THE ENERGY OF SPACESHIP Y?

6 HOW MANY TRADE ROUTES ARE THERE FROM STARBASE ———

7 WHAT WAS THE LARGEST AMMOUNT OF KLINGONS YOU SAW ON ANY SCAN.

8 A)DID YOU SEE ANY HOLES?
B)HAVE YOU MADE ANY HOLES?

9 HAVE YOU MADE ANY CRACKS DURING YOUR MISSION SO FAR?

10 FOR EACH OF THE FOLLOWING QUESTIONS ANSWER YES OR NO.
A)DO ALL KLINGONS REMAIN STATIC
B)DO ALL KLINGONS MOVE IN STRAIGHT LINES
C)DO KLINGONS MOVE TOWARDS A STARBASE
D)DO KLINGONS MOVE TOWARDS SPACESHIPS
E)DO KLINGONS MOVE ONLY IF THEY ARE ATTACKED

11 FOR EACH OF THE FOLLOWING QUESTIONS ANSWER YES OR NO
A)ARE KLINGONS MADE BY ANOTHER COMMANDER?
B)ARE KLINGONS MADE BY A BEING IN THE CENTRE OF THE UNIVERSE

12 FOR EACH OF THE FOLLOWING HYPOTHESES ANSWER YES OR NO
STARBASES ———
AND ———
A)COMPETE FOR TRADE
B)CO-OPERATE IN TRADE
C)ARE INDEPENDENT

13 FOR EACH OF THE FOLLOWING HYPOTHESES ANSWER YES OR NO
A)FREIGHTERS ARE LIKE SPACESHIPS
B)FREIGHTERS ARE LIKE KLINGONS

14 WHICH STARBASES ARE DEPENDED ON BY STARBASE ———

15 A)GIVE AN EXAMPLE OF AN ENTITY WHICH IS SIMILAR TO STARBASE ———
B)TYPE IN ON NOT MORE THAN TWO LINES HOW THE TWO DIFFER

16 WILL THE ECONOMY OF STARBASE ———
INCREASE, DECREASE, OR REMAIN CONSTANT IN THE NEAR FUTURE

17 WHAT IS THE STATISTICAL CORRELATION FROM -1 TO +1
BETWEEN THE TRADE OF
STARBASES ———
AND ———
AND THAT BETWEEN STARBASES ———
AND ———

18 IT IS A FACT THAT STARBASE HAS AN ENERGY LEVEL OF ———.
WHEN YOU LAST ENCUIRED THE ENERGY OF STARBASE ———
WAS ———
WHAT DO YOU SUPPOSE IT IS AT THE MOMENT?

19 A)GIVE AN EXAMPLE OF AN ENTITY WHICH BEHAVES LIKE A FREIGHTER
B)TYPE IN ON NOT MORE THAN TWO LINES HOW THEY DIFFER

20 THINK OF THREE ENTITIES, E.G. A SHIP, A FREIGHTER, A KLINGON
A)TYPE IN THE TWO WHICH ARE MOST ALIKE, THEN THE DIFFERENT ONE
B)ON NOT MORE THAN TWO LINES TYPE A DESCRIPTION OF HOW THE PAIR ARE ALIKE
C)ON NOT MORE THAN TWO LINES TYPE A DESCRIPTION OF HOW THE OTHER ONE IS DIFFERENT FROM THE PAIR

21 IF THE CHANCE ON ANY SCAN OF ENCOUNTERING AT LEAST ONE KLINGON IN CELL B2 IS 6%, WHAT IS THE CHANCE OF ENCOUNTERING AT LEAST ONE KLINGON IN CELL F5?
1) MORE THAN 6%
2) JUST 6%
3) LESS THAN 6%

22 IS THE CHANCE OF SEEING AT LEAST ONE KLINGON IN CELL B2 AND F5 AT ANY SCAN
1) 0% TO 20%
2) 21% TO 40%
3) 41% TO 60%
4) 61% TO 80%
5) 81% TO 100%

23 HOW RICH IN ENERGY IS STARBASE ———

Table 10: Interrogation Session Question Forms

List I.

1	HOW MANY KLINGONS DID YOU ENCOUNTER?
2	HOW MANY KLINGONS DID YOU ATTACK?
3	HOW MANY KLINGONS DID YOU DESTROY
4	HOW MUCH ENERGY DID YOU LOSE TO KLINGONS ?
5	A)WHAT IS THE ENERGY OF SPACESHIP X? B)WHAT IS THE ENERGY OF SPACESHIP Y?
6	HOW MANY TRADE ROUTES ARE THERE FROM STARBASE ————
7	WHAT WAS THE LARGEST AMMOUNT OF KLINGONS YOU SAW ON ANY SCAN.
8	A)DID YOU SEE ANY HOLES? B)HAVE YOU MADE ANY HOLES?
9	HAVE YOU MADE ANY CRACKS DURING YOUR MISSION SO FAR?
10	FOR EACH OF THE FOLLOWING QUESTIONS ANSWER YES OR NO. A)DO ALL KLINGONS REMAIN STATIC B)DO ALL KLINGONS MOVE IN STRAIGHT LINES C)DO KLINGONS MOVE TOWARDS A STARBASE D)DO KLINGONS MOVE TOWARDS SPACESHIPS E)DO KLINGONS MOVE ONLY IF THEY ARE ATTACKED
11	FOR EACH OF THE FOLLOWING QUESTIONS ANSWER YES OR NO A)ARE KLINGONS MADE BY ANOTHER COMMANDER? B)ARE KLINGONS MADE BY A BEING IN THE CENTRE OF THE UNIVERSE
12	FOR EACH OF THE FOLLOWING HYPOTHESES ANSWER YES OR NO STARBASES ———— AND ———— A)COMPETE FOR TRADE B)CO-OPERATE IN TRADE C)ARE INDEPENDENT
13	ANSWER YES OR NO:- ARE YOU CONCENTRATING MOSTLY ON A)INVESTING YOUR ENERGY? B)PROTECTING TRADE ROUTES?
14	WHICH STARBASES ARE DEPENDED ON BY STARBASE ————
15	A)DID YOU USE TACTICS,IFSO WHY? B)DID YOU INVEST,IF SO WHY? C)WHAT HAVE YOU DONE SINCE THE LAST INTERROGATION?
16	WILL THE ECONOMY OF STARBASE ———— INCREASE,DECREASE,STAY CONSTANT DURING THE NEXT SESSION?
17	WHAT IS THE STATISTICAL CORPELATION FROM -1 TO +1 BETWEEN THE TRADE OF STARBASES ———— AND ———— AND THAT BETWEEN STARBASES ———— AND ————
18	IT IS A FACT THAT STARBASE ———— HAS AN ENERGY LEVEL OF ————. WHEN YOU LAST ENQUIRED THE ENERGY OF STARBASE ———— WAS ———— WHAT DO YOU SUPPOSE IT IS AT THE MOMENT?
19	ON NO MORE THAN TWO LINES TELL ME:- WHAT DO YOU PLAN TO DO DURING THE NEXT SESSION?
20	ON NO MORE THAN TWO LINES TELL ME:- WHAT ENTITIES CAN YOU RECOGNISE IN INNER SPACE?
21	IF THE CHANCE ON ANY SCAN OF ENCOUNTERING AT LEAST ONE KLINGON IN CELL B2 IS 6%, WHAT IS THE CHANCE OF ENCOUNTERING AT LEAST ONE KLINGON IN CELL F5? 1) MORE THAN 6% 2) JUST 6% 3) LESS THAN 6%
22	IS THE CHANCE OF SEEING AT LEAST ONE KLINGON IN CELL B2 AND F5 AT ANY SCAN 1) 0% TO 20% 2) 21% TO 40% 3) 41% TO 60% 4) 61% TO 80% 5) 81% TO 100%
23	HOW RICH IN ENERGY IS STARBASE ————

Table 11 Interrogation Session Question Forms

List II

Even after this somewhat arbitrary condensation the mass of data is formidable in quantity, though even cursory inspection shows a content of considerable interest and quality. There are some obvious trends which stand out as a result of visual inspection. Clearly, the analysis of these trends and a proper statistical examination depends upon taking the disc stored data and processing it, through one or more analytic programs.

These programs have not yet been written since it was only recently that the kinds of trend to look for became evident; further, even now, the trends events, etc, of interest, are not exhausted.

In this report attention is chiefly restricted to some gross indices of decision style and their relation to the pretest and post-test of conceptual style. It is also possible to comment upon interrogation data and in an admittedly tentative manner, the planning mesh data. The main empirical content of the report is in detailed performance and interrogation response records (which are on disc file for all subjects), of which eight samples are shown (5 for individuals under different conditions, and 3 for team decision making).

5.1. Approximations to an Ideal Design

The experimental design is necessarily flexible, for many combinations of non attendance and system failure, can render any particular session quite useless. As an objective we have tried to achieve sessions in which individuals and two person teams are required to deal with two conditions; namely, critical and relatively non critical states of the environment, obtained by altering the excess energy dissipation needed to produce a hole or a crack. Ideally, the sequence is shown (for A and B as representative subjects) in Fig 23.

	Individual Sessions		Team Sessions	
	1	2	1	2
Training and stylistic testing	Non Critical State	Critical State	Non Critical State	Critical State
	A	B	AB	AB
	B	B	AB	AB

Fig 23 Ideal Design for the Experiment

Planning should take place between the individual sessions and the team session (we originally aimed to have planning mesh elicitation, also, between individual sessions and at the end of the series).

In fact, for the reasons noted, the order of events cannot be so rigidly controlled, and the records, though they all involve individual sessions under critical and non critical conditions, as well as team sessions under critical and non critical conditions do not usually respect this order. The constraints actually imposed are as follows :

(1) Each subject undergoes training first, so that all subjects are familiar with the task (how to obtain information, control the vehicles, etc).

(2) Each subject engages in non critical individual operation before engaging in a team session (but the critical individual session is sometimes fitted in before team operation, sometimes after one or more team sessions) ie. each subject is familiar with the mission, as well as the task, before team operation.

(3) Two team sessions and two individual sessions take place and the non critical team session is usually but not always first. The circumstances of subject availability determine what happens, and if a subject who has already engaged in non critical team operation is available for pairing up with a trained and mission experienced (individual mode) subject, then the preferred order is reversed.

(4) Of the two individual sessions, some subjects carry out the critical session after the 1st team individual session (as preferred), some after the 1st team session, and some after the 2nd team session.

(5) Planning takes place at least once for each subject.

(6) The initial stylistic test (one of two different, but matched, tests) is usually administered at the same session as task training though occasionally after the 1st individual sessions, or the 2nd session (individual or not).

(7) The 2nd stylistic test is administered after the 2nd team session.

(8) For the purpose of assessing changes in conceptual style, we accept subjects who have had experience in the system between stylistic tests; some of them, for one reason or another, have been unable to complete the series.

By permitting these deviations from the ideal it has been possible to process the stipulated numbers of individuals and teams. Under constraints (1) to (6) and, also to collect useful data (how much is uncertain at the moment), from subjects who did not complete the series, satisfying at least (6), (7), and (8) with variable experience of the systems.

5.2. General Behaviours (Individual or Team)

Since spacecraft cannot remain motionless subjects have to deal with both of them; otherwise, a neglected spacecraft will drift and usually meet an obstacle so that its energy is rapidly reduced. There is considerable variation between subjects, and (for any one subject) between episodes, in how attention is given to the spacecraft X and Y; sometimes commands to X alternate with commands to Y; sometimes there are lengthy sequences of commands addressed to one spacecraft.

Since it is virtually impossible to keep track of the space environment without appealing to enquiry data, all subjects use the enquiry facilities and, from time to time, use all of the types of information available. In conformity with the earlier findings, (Section 2) there are personal biasses in favour of taking a global overview, or a more detailed and partitioned view (as a rule, concentrating upon numerical data like starbase energies), but the type of information requested at a given point is probably as much influenced by the context, (the prevailing conditions) as it is by a subject's disposition.

The joint requirement of managing spacecraft and monitoring the space environment, induces overload, even in non critical conditions, so that all subjects learn to rely upon the construction of tactics based upon the schemes and the command to select and to execute the tactic. Hence, there is a pronounced learning trend during the 1st individual session, tactics being assigned to one spacecraft and later to both. Double (X and Y) tactic assignment is the rule; exceptions occur for special manoeuvres or tricky situations.

Subjects learn, much more slowly, how to avoid making holes or cracks in space (some being unavoidable in the critical condition) and they also learn how to repair and/or circumnavigate these barriers.

Amongst the tactic commands No 2 "Go to a Starbase and eliminate Klingons" and No 3, "Go to a location and eliminate Klingons" are the most frequently used. On this basis it is possible to pick out recognisable though fundamentally complex modes of behaviour their complexity being merely indicated by the relative frequency with which tactic type 2 and the other tactic type 3, are chosen. As a first approximation to a decision style obtained from the records (as in 1 to 8) let these modes of behaviour be called "base oriented" and "marauder oriented".

There are various criteria for judging the successfulness of decision making; up to a point at which the starbase economy collapses. One of these criteria is the standing value of starbase energy or its incremental differences, allowing for limits below which no one Starbase energy should drop. Another criterion is some converse index of the attrition rate of Klingons (upon barges and spacecraft and starbases). Another criterion is the number of Klingons eliminated (on the assumption that they will impede trade along the trade routes).

Under non critical circumstances, the mode called "Base oriented" tends to maximise success according to the first criterion (though it has a variable effect upon the attrition criterion), and is not at all successful in respect of eliminating Klingons. Again under non critical conditions, the mode "Marauder oriented" tends to maximise success according to the last (Klingon elimination) criterion to make a variable grade on the attrition criterion and to have little success in respect of the first criterion (Starbase energies).

Of the detailed records No 1 shows a typical "Base oriented" decision maker, and Record No 2 shows a typical "Marauder oriented" decision maker, both acting individually and in non critical conditions of the space environment.

The optimality picture is quite different, under conditions that are critical. Neither mode of behaviour is at all successful, according to any of the criteria, if adopted on its own, in the individual system, and, only if there is a careful and well

coordinated, division of labour, in the team system. Records 3 and 4 show the fate of the same subjects as Records 1 and 2 under critical conditions, only one succeeding by a change in decision style. The fate of another subject, obtaining minimal success, is shown in Record 5.

Neither "Base Orientation" indices or "Marauder Orientation" indices correlate significantly with the Comprehension and Operation scores in the tests for conceptual style. With the small sample of subjects so far employed, there is no possibility of establishing creditable, differential, statistically significant results. However, there is a marked positive correlation between the versatility score on the tests for conceptual style and the ability and/or willingness to change "Decision Style" when the criticality of the space environment is grossly altered. It should be emphasised that the gross change merely parodies a fluctuation of context dependent criticality which goes on throughout decision making.

Records 6, 7 and 8 present data from team decision making (they are included, at this point, for easy reference and will be discussed later).

5.3. Interrogation Responses and Planning Meshes Considered Together

Probably due to the pretraining, and operational realism of the task, subjects do have fairly exact images of their surroundings, of the trade routes and starbases they have encountered (consequently those which they are questioned about), and other factual matters. As suggested by the pilot experiments but more tangibly confirmed by the present data, there is appreciable individual difference in how such images are built up. Broadly speaking, the local/global classification is just as valid here, as in the pilot experiments, but with the greater refinement it is possible to recognise several kinds of imagery or description, for example, the following "centricities" are recognisable by inspection of the records, and without numerical analysis of the data.

(1) Economy centred image (may be specific to some starbases or may include all of them).
(2) Spacecraft centred image (usually emphasising the energy level and security of the spacecraft, invariably both spacecraft).
(3) Klingon plan and Klingon tactic centred Image, (the Spacecraft are seen as parts of a plan for eliminating Klingons).

(4) Trade Protection Plan and Tactic centred Image (perhaps a variant upon the Klingon elimination plans, but, if so, a very marked one).
(5) Space centred Image (where trade routes, barges, Klingons, and ships, are located; particularly where holes and cracks are located).
(6) Crack avoidance images.

Informal evidence from sketches and notes, collected after subjects have taken part in the mission, (and left lying around the consoles), indicates an appreciable difference in the sophistication with which global aspects of space are comprehended. For example, the sketches shown in Fig 24 indicate more record keeping. They are moderately accurate copies of global scenes. In contrast, Fig 25 shows a rather successful attempt to transform the display coordinates and to determine which trade routes are blocked by different cracks in space.

The marked individual differences are, however, context dependent; for example, at least four subjects have (as judged by their interrogation responses) switched from Type (3) (Klingon Plan and Tactic Image) to Type (4) (Trade Protection Plan and Tactic images) when the condition of the space environment is changed from non critical to more critical, and these transitions parallel the already noted change from the "Marauder Oriented" behaviour to a more complex strategy. Similarly, "Base Oriented" behaviour tends to go with Type 1 (Economy Centred) images or Type 5 (Space Centred) images. Once again, there is a transition when the criticality of the space environment is altered and, at any rate in team operation, there are context and behaviour dependent transitions that occur "Spontaneously" (ie. without deliberate change in a task parameter).

These comments point out the difficulty over dissociating the construction of a planning mesh from operation and interrogation. In order to obtain anything like the degree of exteriorisation possible, it is essential to integrate these features of the system more satisfactorily (by ordinary standards a great deal of normally hidden conceptualisation is externalised, as it stands, but very much more of it could be externalised for observation and quantification).

5.4. Response to Types of Interrogation

Subjects are able to select amongst reasonable hypotheses unless they are at a particularly critical point in the operation, when they tend to respond (NA) or "no reply". They are, also, able to recall and to justify why they acted as they did.

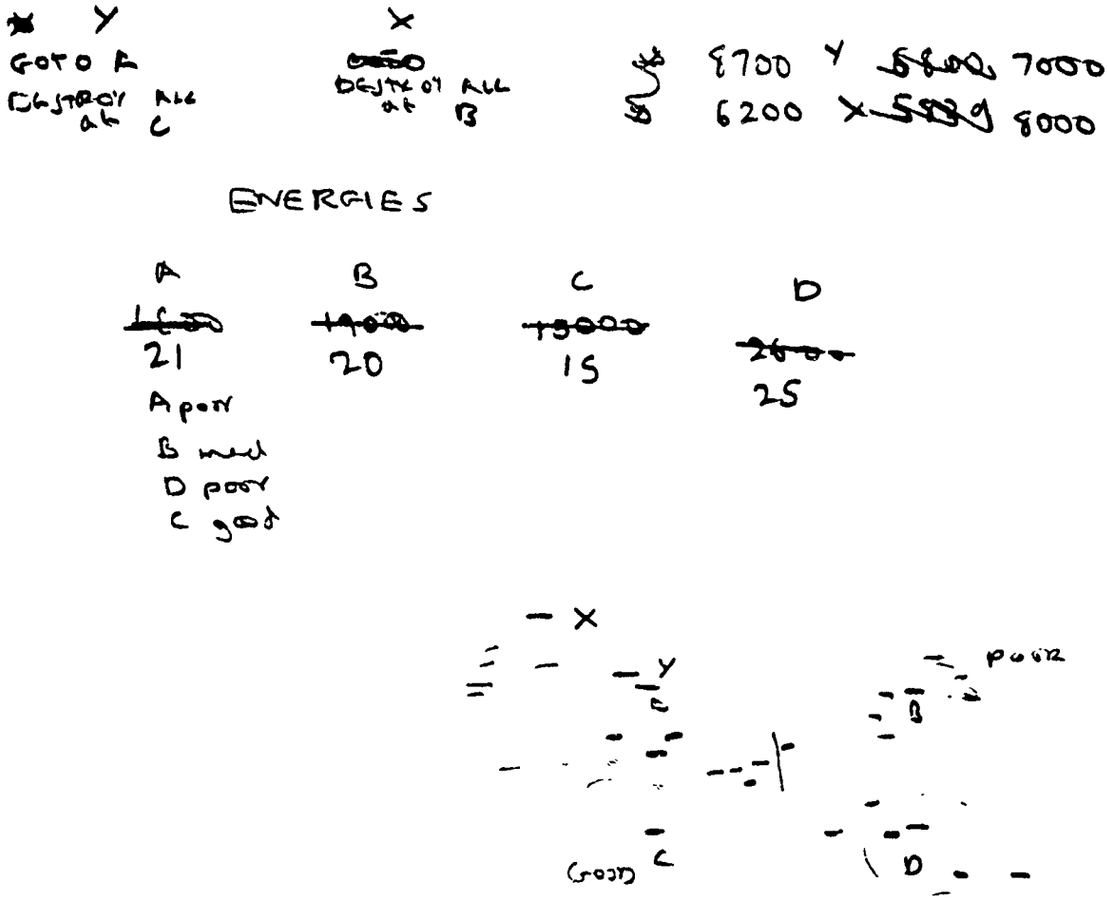


Fig 24: Subject Record

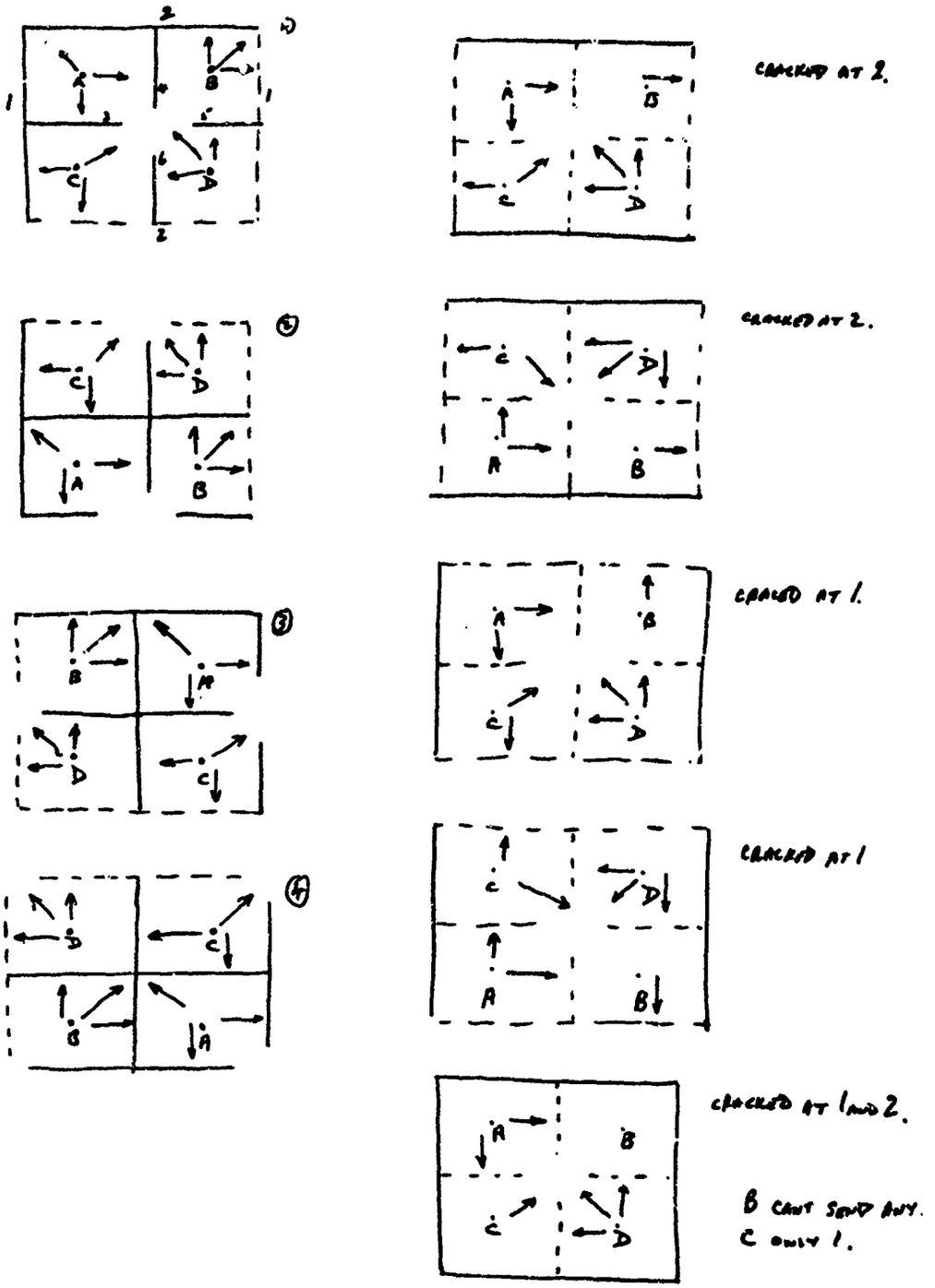


Fig 25: Subject's Global view of Cracks and trade routes exploiting topological transformation of Space Environment

There is a great deal of individual difference in willingness to state intentions (answer the how and why type of interrogation); there is also a superficially consistent individual difference between subjects concerning the hypotheses they entertain about the environment; for example, in the context of "Do Starbase - and Starbase- Compete or Cooperate for trade, or are they independent" (where the blanks are filled by the most recently visited starbases). Similarly, there is a seemingly consistent difference between individuals' knowledge of energy lost to Klingons and this appears, at first sight, to correlate positively, with general knowledge about numerical values (absolute, rather than relative, energy levels, for instance). But (again, without full analysis), either negatively or not at all, with the accuracy of predictions in reply to "Will the economy of Starbase - increase decrease or remain constant" or "Which Starbases are dependent upon Starbase - " (blanks filled by the most recently visited starbases).

5.5. Confidence Estimates

For all interrogation questions that are answered, subjects state a level of confidence or assurance in their replies. Much the same kinds of individual differences found in other populations appear to exist amongst members of this group of subjects. In particular, some subjects are very confident (the converse, very unsure, usually elicits NA instead) and the dichotomising effect, reported by Philips, and others, is repeated; that is, high confidence values are replaced by "Certain", and "middle" values are given numerical indices.

Where statements may be veridically true or false (hence, correct or not), there is no discernible relationship between accuracy or correctness and degree of confidence in a response.

In order to obtain a baseline for the consideration of the stylistic tests and confidence estimation values that are typical of the subjects used as commanders in the decision system, a group of 64 subjects have been tested on at least one of the stylistic tests. Their scores on confidence estimation questions, addressed to the test data base, have been isolated; hence, all responses can be judged (by matching) correct or mistaken. Moreover, the questions eliciting confidence estimation responses can be assigned to categories of global (on the X subscore) or rule oriented (on the U subscore) or general, factual data (on the R subscore).

The correlation matrix is shown in Table 12, where the main scores N, O, C, V (Neutral, Operation, Comprehension, and Versatility) are related to confidence, in general, confidence of correct, and confidence of mistaken responses to questions of the type X, Y and R. As might be expected, subjects with high N (factual, general) scores are confident when correct about R scale questions (accounting for some 64% of the variance) and not confident when they are not correct (about 35% of the variance). There is no marked difference in degree of confidence between the stylistic score indices. If it were legitimate (as it probably is) to combine confidence when correct with lack of confidence when not correct, the differential between question categories would be of interest for the comprehension and possibly the versatile subjects.

5.6. Probabilistic Interrogation Questions

Without exception, subjects are disinclined to answer probabilistic interrogation questions (even though "correlation", the only technical term, is fully explained). The questions at issue are

"If the chance on any scan of encountering ....."

"Is the chance of seeing at least one Klingon in ...."

"What is the statistical correlation between starbase ---- and --- (the next but last and last visited starbases) ..."

"It is a fact that Starbase --- (last visited) has energy level --- (actual value). When you last enquired about starbase --- (last visited) the energy was --- (the actual value at the moment of enquiry). What do you suppose it is, at this moment".

It should be stressed that probabilistic type enquiries are made only about objects, or events, observed recently by the subject and that the last question depends upon the subject asserting a dependency which influences the current energy level. Even so, subjects are loath to reply and, if they do reply, appear to make haphazard responses, and to have little confidence in their response.

These observations strongly suggest that people do not use probabilistic arguments in their thinking. That conclusion has been rightly criticised on the grounds that subjects obtain no real aid from probabilistic

	UM	XM	RM	UC	XC	RC	UMC	XMC	RMC
N	-0.074	-0.276	-0.608	0.306	0.314	0.817	0.390	0.150	0.518
O	-0.133	0.053	-0.089	0.290	0.273	0.091	0.308	0.517	0.031
C	0.012	-0.238	-0.209	0.030	0.579	0.211	0.061	0.641	0.070
V	-0.020	-0.123	-0.163	0.200	0.421	0.159	0.287	0.528	0.045
Mean	30.00	15.53	33.06	58.08	32.85	67.99	84.45	48.30	98.55
SD	17.70	11.40	22.65	23.10	14.10	28.20	15.43	8.76	18.75

	N	O	C	V
Mean	72.72	54.36	62.73	30.96
SD	21.32	19.65	18.74	22.26

Table 12. The matrix of correlation coefficients relating the main scores on the stylistic tests and indices of confidence, obtained from n = 64 subjects, as their degree of belief in response to questions spanning rule oriented (U), global (X) and factual topics (R). Letters N,O,C,V stand for mean score variables (Neutral, Operation, Comprehension and Versatility). UM, XM, RM ,for confidence (in response to U,X,R type,questions) when mistaken, UC, XC, RC confidence when correct and UMC, XMC, RMC when either correct or mistaken.

statements; a defect which can be remedied by inputting their estimates to a simple program, which points out useful data, if they do, in fact, use probabilistic arguments. However, this remedy must be augmented by incorporating comparably helpful programs that are able to rationally extrapolate from their other responses. This is not difficult; it enables the comparison of equally "helpful" (or, at least rational with obvious calculating "effort") reactions to different kinds of response. As one candidate, there is extrapolation based upon similarity indices. As another candidate, there are several extrapolative procedures available for presenting useful summary or predictive data according to a possibilistic (Zadeh) scheme.

5.7. Team Decision Making

The team decision making records (6, 7, and 8) are complex and illustrate various modes of operation that are seen to fluctuate, depending (by hypothesis) upon the instantaneous "criticality" of conditions in the environment of space.

It should be recalled, when inspecting these records, that the repair of a "Crack" in space demands cooperation. That is, in the team operation mode, Crack repair requires the joint presence of at least one Spacecraft belonging to each of the commanders, ie. a configuration such as

X_A, X_B or X_A, Y_B or

Y_A, X_B or Y_A, Y_B

not simply (as in one person operation), the joint presence of X and Y at the same location in space.

To a large extent, cooperation relies upon coordinating communication between the commanders (it is possible to have cooperation without this facility but all the subjects so far employed in teams have used it).

One overall effect (since cooperation must take place, at least in Crack repair), is "learning to communicate". Such learning amounts to the development of a "private language" in which terse messages are (usually) intelligible to both commanders. These messages, recorded in order between the interrogation sessions, refer to somewhat different topics for different teams.

There is always a procedural dialogue bearing upon where Cracks, Spacecraft, and certain other entities are located (Klingons, and Freighters and Trade Routes, for example). Some of the teams concentrate entirely upon messages of this type, but there are several interesting specialisations.

(a) Discussion of Starbase Economies

(b) Discussion of investment policies

(c) Discussion of Trade Route hazards

(d) Discussion of hypotheses about inner space

(e) Discussion of general hypotheses and intentions, the deployment of Spacecraft, tacit assignment of resources, or division of labour ("you find out what is over there" or, "I have obtained information about the global scan and Klingon distribution").

When the energy levels are not critical there is a tendency for the commanders to compete (at least in investment) or, if not to compete in a literal sense, to act independently. However, as soon as the energy levels are reduced, there is a tendency to cooperate and co-operation becomes mandatory (if the starbase economy and the Spacecraft are to survive) when Cracks are produced.

Subjects discussing topics (a) and (b) often have some more or less formulated investment plan; subjects discussing topics (c), (d), and (e) are more like mission oriented strategists. These differences are worthy of investigation by a more detailed analysis of message content and the relation of such an analysis to interrogation responses and behaviours. It is particularly intriguing that some teams seem to "gang up" against the "supervisor" (a program!)

5.8. The Integrity of a Team Organisation

When speaking of teams we commonly use words like "role" and not infrequently say that people, acting as team members, can adopt any "role", thereby changing their function and, to some extent, their attitude. In the present study, such statements are almost unavoidable for there is no rigid demarcation of roles; the roles develop in the course of the decision process. That is true of many real life teams, even if roles are quite rigidly assigned; under stress it may be necessary for one person to act in several roles and, even if this

is not the case, there is a sense in which "teams" have reality only insofar as the members "understand each others' roles", whether or not they are called upon to act in these roles.

In fact, the team is a kind of individual; the roles taking the place of the differing perspectives adopted by an individual decision maker, and the fluctuating balance of competition and cooperation; of communication and no communication, bears witness to this phenomenon which resembles the competitive and cooperative orientations described by Braten.

Throughout the report we have stressed the systemic character of the process and the idea that "Decision Making" is properly attributable to the entire "system". In this picture of things, the team appears as an organisation, but it could equally well be argued that the concept of a team entails the computing and other aids involved, as well as the people in that team.

In this case, there is evidence that the competitive/cooperative fluctuation is manifest in a somewhat more profound sense. For, although there are conversations in which team members interact through messages, it is also true that the actions of A's spacecraft can, indirectly (and under certain circumstances such as "hole distributions" and "crack distributions"), determine the actions of B's spacecraft and vice versa.

At the moment, these interactions are indirect. To render them direct it is only necessary to arrange that A's Tactics can call upon B's spacecraft (as well as A's) and B's tactics on A's spacecraft (as well as B's), so that (recalling that tactics include information gathering, and the like) there is a sense in which A's autonomy and B's autonomy is (again under certain circumstances), lost. The spacecraft themselves assume autonomy, or, more generally, the integrity of a team depends upon the existence of autonomous subsystems, in one autonomous man/machine decision process. The system has a role to perform the mission. The autonomous entities, people, or aggregates of people, are autonomous roles. It is these roles, including the role of the entire system, that have an integrity.

Record 1

SESSION N1.

1	1	19220	0	0	0
1	0	21211	0	0	0
0	0	18567	0	0	0
0	0	18875	0	0	0
3	0	7000	0	1000	0
0	0	5950	0	1000	0

TACTICS

1	0	3	0	0
200	0	0	0	0
2	0	0	0	0
1	0	2	0	0
1	0	3	0	0
200	0	0	0	0
4	0	0	0	0
1	0	2	0	0

COMMANDS
GG7GG7777GG7

CRACKS

0 0 0 0 0 0 0

SESSION N2.

1	1	17742	18472	9000	0
1	1	20319	20868	9000	0
0	1	17593	18207	0	0
0	1	17540	18139	0	0
3	0	4595	0	1500	0
3	0	4967	0	1500	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	8	0	0	0
1	0	3	0	0
1	2	3	0	0
200	200	0	0	6
4	6	0	0	0
1	0	2	0	0

COMMANDS
1DD1MDI6MG2I
32 9

_0 0 1 1 0 0 2

SESSION N1.
QUESTION 1 PART 1
6
10
QUESTION 2 PART 1
6
10
QUESTION 3 PART 1
6
10
QUESTION 4 PART 1
3500
10
QUESTION 5 PART 1
7000
10
QUESTION 5 PART 2
5950
20
QUESTION 6 PART 1
N
10
QUESTION 6 PART 2
NA
10
QUESTION 6 PART 3
Y
5
QUESTION 6 PART 4
N
10
QUESTION 6 PART 5
NA
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
NA
01

SESSION N2.
QUESTION 1 PART 1
3
10
QUESTION 2 PART 1
800
10
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
NA
10
QUESTION 4 PART 2
NA
10
QUESTION 5 PART 1
Y
10
QUESTION 5 PART 2
Y
10
QUESTION 6 PART 1
ALL OTHER STARBASES
10
QUESTION 7 PART 1
Y TO HELP IN LONG TERM ATTACKSITUATIOJS
10
QUESTION 7 PART 2
TO ORTAIN MORE ENERGY ADN MORE PROFIT
10
QUESTION 7 PART 3
MOVED FROM STARBASE A AND B AND
10
QUESTION 8 PART 1
20000
10

SESSION N3.

0	0	16484	18472	9000	0
0	1	18914	20888	9000	0
1	1	16204	18207	3000	0
1	0	20228	18139	3000	0
3	0	4647	0	1500	0
2	0	4107	0	2000	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	8	0	0	0
1	1	3	0	0

1	2	3	0	0
200	200	0	0	0
4	6	0	0	0
1	1	4	0	0

COMMANDS
71RM21IMMM27
5

CRACKS

0 0 0 1 0 0 2

SESSION N4.

1	0	22207	18472	11500	0
1	1	17809	20888	11500	0
0	1	15072	18207	3000	0
0	1	18876	18139	3000	0
3	0	3709	0	2500	0
5	0	5078	0	2500	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	8	0	0	0
2	1	5	0	0

1	2	3	0	0
200	200	0	0	0
4	6	0	0	0
2	1	5	0	0

COMMANDS
2MG17RMI12MG
5 5

CRACKS

0 0 0 0 0 0 2

SESSION N3.
QUESTION 1 PART 1
3
10
QUESTION 2 PART 1
MANY
10
QUESTION 3 PART 1
35
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
STARBASES A C D
10
QUESTION 6 PART 1
Y TO HELP FIGHT KLINGONS
10
QUESTION 6 PART 2
YES
10
QUESTION 6 PART 3
KILLED KLINGONS AND INVESTED!
10
QUESTION 7 PART 1
INCREASE
01
QUESTION 8 PART 1
30000
10

SESSION N4.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
2000
10
QUESTION 3 PART 1
NA
10
QUESTION 3 PART 2
NA
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 4
N
10
QUESTION 4 PART 5
NA
110
QUESTION 5 PART 1
N
10
QUESTION 5 PART 2
Y
10
QUESTION 6 PART 1
Y
10
QUESTION 6 PART 2
Y
10
QUESTION 6 PART 3
N
10
QUESTION 7 PART 1
STARBASES A C D
10
QUESTION 8 PART 1
Y TO PERFORM BETTER
10
QUESTION 8 PART 2
TO BECOME RICH
10
QUESTION 8 PART 3
DOCKED AG A AND B
10

SESSION N5.

0	0	20876	18472	11500	0
0	1	16761	20885	11500	0
0	1	13538	18207	3000	0
1	1	23468	18139	7500	0
3	0	5403	0	2500	0
7	0	7171	0	2500	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	8	0	0	0
2	2	5	0	0

1	2	3	4	0
200	200	0	0	0
4	6	0	0	0
2	1	5	1	0

COMMANDS
MMMMGMD7111S

CRACKS

1 0 0 0 0 0 6

SESSION N6.

0	1	19857	20305	11500	0
0	1	15968	16096	11500	0
0	1	11981	12492	3000	0
1	1	22020	22280	7500	0
3	0	3503	0	3000	0
1	0	4021	0	3000	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	8	0	0	0
2	2	6	0	0

1	2	3	4	0
200	200	0	0	0
4	6	0	0	0
2	1	5	1	0

COMMANDS
21442SMMGI61
579

CRACKS

1 0 0 0 0 0 .

100

SESSION N5.
QUESTION 1 PART 1
NA
10
QUESTION 2 PART 1
NA
10
QUESTION 2 PART 2
NO
10
QUESTION 3 PART 1
YES
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
ALL OTHER STARBASEZ
10
QUESTION 6 PART 1
TO IMPROVE PERFORMANCE
10
QUESTION 6 PART 2
TO BECOME RICHER
10
QUESTION 6 PART 3
JOINED SPACESHIPS
10
QUESTION 7 PART 1
INCREASE
10
QUESTION 8 PART 1
NA
10

SESSION N6.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
1500
10
QUESTION 3 PART 1
4903
10
QUESTION 3 PART 2
4821
10
QUESTION 4 PART 1
35
10
QUESTION 5 PART 1
TO HELP MT MOVEMENTS
10
QUESTION 5 PART 2
TO CONTROL KLINGONS
10
QUESTION 5 PART 3
CHANGED KLINGONS DISTRIBUTION
10
QUESTION 6 PART 1
NA0
10
QUESTION 7 PART 1
NA
100
QUESTION 8 PART 1
22100
10

SESSION N7.

1	0	22781	20305	18500	0
1	1	16525	16096	18500	0
0	1	10655	12492	3000	0
0	1	20626	22280	7500	0
3	0	6307	0	3500	0
1	0	4940	0	3000	0

TACTICS

1	2	3	0	0
200	200	0	0	0
2	6	0	0	0
3	2	6	0	0

1	2	3	4	0
200	200	0	0	0
4	6	0	0	0
3	1	5	1	0

COMMANDS
RI2I2SDISMMD
5 4

CRACKS

0 0 0 0 0 0 6

SESSION N8.

1	0	22641	20305	21500	0
0	1	15303	16096	18500	0
1	1	10152	12492	3000	0
0	0	19541	22280	7500	0
3	0	6740	0	3500	0
3	0	2040	0	3500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
4	2	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
3	2	6	1	1

COMMANDS
GMGD72IIMD77
78

CRACKS

0 0 0 0 0 1 7

SESSION N7.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
$6 /6
.0
QUESTION 2 PART 2
4940
10
QUESTION 3 PART 1
LOTS
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
N
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 4
N
10
QUESTION 4 PART 5
N
10
QUESTION 5 PART 1
ALL OTHER STARBASES
10
QUESTION 6 PART 1
TO STEER BETTER
10
QUESTION 6 PART 2
TO ATTRACT KLINGONS
10
QUESTION 6 PART 3
DOCKED AT A AND B
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
NA
10

SESSION N8.
QUESTION 1 PART 1
NA
10
QUESTION 1 PART 2
NA
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
NA
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
N
10
QUESTION 5 PART 1
TO FIND WAY ARGUND SPACE
10
QUESTION 5 PART 2
TO GET ENERGY
10
QUESTION 5 PART 3
BOUGHT TACTICS
10
QUESTION 6 PART 1
STAY SAME
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
NA
10

SESSION N9.

1	0	23357	20305	24500	0
0	1	14203	16096	18500	0
1	1	12128	12492	9000	0
0	0	18530	22250	7500	0
3	0	7133	0	3500	0
4	0	2781	0	3500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
2	8	0	0	0
4	2	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
3	2	6	1	1

COMMANDS
11116RM2MMDI
5 3

CRACKS

0 0 0 0 0 0 7

SESSION N10.

1	1	27373	25777	30000	0
0	1	12975	13259	18500	0
0	1	10880	11188	9000	0
0	:	17250	17533	7500	0
3	0	5633	0	3500	0
1	0	5384	0	3500	0

TACTICS

1	2	3	4	5
200	20?	0	0	0
2	8	0	0	0
4	2	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
5	2	6	1	1

COMMANDS
71DMMDIIII71
453

CRACKS

e 0 1 0 0 0 8

SESSION N9.
QUESTION 1 PART 1
35
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
N
10
QUESTION 3 PART 3
Y
10
QUESTION 3 PART 4
N
10
QUESTION 3 PART 5
N
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
Y
10
QUESTION 5 PART 1
TO TRY TO FIND OUT WHERE I AM
10
QUESTION 5 PART 2
TO GET ENERGY
10
QUESTION 5 PART 3
GOY LOYST
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
22200
10
QUESTION 8 PART 1
FIND OUT WHERE I AM AND KILL
10

SESSION N10.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
NA
10
QUESTION 2 PART 2
NA
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
Y
10
QUESTION 4 PART 1
TO IMPROVE PERFORMANCE
10
QUESTION 4 PART 2
TO GAIN ENERGY
10
QUESTION 4 PART 3
MADE A MESS OF IT
10
QUESTION 5 PART 1
INCREASE
01010
QUESTION 6 PART 1
28777
10
QUESTION 7 PART 1
TRY TO KILL MORE KLINGONS
010
QUESTION 8 PART 1
A CHANGING PATTERN
10

SESSION N11.

0	0		26116	25777	30000	0
1	1		15263	13259	21500	0
0	1		9571	11188	9000	0
0	0		16094	17533	7500	0
3	0		4332	0	3500	0
1	0		6877	0	4500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
4	3	0	0	0
5	2	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
5	2	8	1	2

COMMANDS
SGG-1217177M
2

CRACKS

0 0 1 0 0 0 8

SESSION N12.

0	1		24705	25777	30000	0
1	1		14297	13259	24500	0
1	1		9301	11188	13500	0
0	1		14678	17533	7500	0
3	0		3256	0	3500	0
1	0		4065	0	4500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
4	8	0	0	0
5	2	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
5	3	8	1	2

COMMANDS
R71SMM1MMMMM
5

CRACKS

0 0 0 0 0 0 8

SESSION N11.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
10
0
QUESTION 3 PART 1
4286
10
QUESTION 3 PART 2
6877
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
TO HELP IN JOB
10
QUESTION 5 PART 2
TO KEEP BALANCE
10
QUESTION 5 PART 3
TAKE A SCAN AND DECIDE ON PLAN
10
QUESTION 6 PART 1
NA
110
QUESTION 7 PART 1
FINDPUT WHERE Y IS AND GO AFTER KLINGONS AND CLEAR SPACE
10
QUESTION 8 PART 1
NONE ONLY A PATTERN
10

SESSION N12.
QUESTION 1 PART 1
35
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
LY
10
QUESTION 3 PART 2
7Y:
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
Y
010
QUESTION 4 PART 3
GOT LOST AGAIN
10
QUESTION 5 PART 1
TRY TO KILL KLINGONS NEAR TO STARBASE C
10
QUESTION 6 PART 1
NONE
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
34000
10

SESSION N13.

0	0	23494	25777	30000	0
0	1	13243	13259	24500	0
1	1	13035	11188	17500	0
1	1	17350	17533	10000	0
3	0	2806	0	3500	0
1	0	3668	0	5500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
4	8	0	0	0
5	3	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
5	4	10	1	2

COMMANDS
1717SM7111SM

CRACKS

0 0 0 0 0 0 0

SESSION N14.

0	1	22097	25777	30000	0
0	1	12399	13259	24500	0
1	0	13973	11188	20500	0
0	1	16338	17533	10000	0
3	0	2151	0	3500	0
1	0	1027	0	5500	0

TACTICS

1	2	3	4	5
200	200	0	0	0
4	8	0	0	0
5	3	7	0	0

1	2	3	4	5
200	200	0	0	0
2	6	0	0	0
5	5	10	1	2

COMMANDS
2166111111MM
542 7

CRACKS

0 0 0 0 0 0 0

SESSION N13.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
NONE
10
QUESTION 3 PART 1
MANY
10
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
NA
10
QUESTION 5 PART 1
I WAS LOST AND NEEDEDTO SEE WHEERE I WAS
10
QUESTION 5 PART 2
I WAS LOW ON ENERGY
10
QUESTION 5 PART 3
NOT MUCH
10
QUESTION 6 PART 1
TRY TO GERT Y DOCKED
10
QUESTION 7 PART 1
NONE
10
QUESTION 8 PART 1
NA
10

SESSION N14.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
NONE0
10
QUESTION 3 PART 1
YES
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
N
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 4
N
10
QUESTION 4 PART 5
N
10
QUESTION 5 PART 1
NO I SHOULD HAVE DONE
10
QUESTION 5 PART 2
NO
1
QUESTION 5 PART 3
MADE A MESS
10
QUESTION 6 PART 1
SING OFF
10
QUESTION 7 PART 1
NONEE ITS A PATTERN
1
QUESTION 8 PART 1
NA
10

RECORD 2

SESSION N1.

0	1	19220	0	0	0
0	0	19211	0	0	0
0	0	18567	0	0	0
0	0	18875	0	0	0
3	0	7100	1	1000	0
5	4	8250	0	0	0

TACTICS

0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

COMMANDS
DEDS443G3D2M

CRACKS

0 0 0 0 0 0 0

SESSION N2.

0	1	17742	0	0	0
0	0	18319	0	0	0
0	0	17593	0	0	0
0	1	17548	0	0	0
3	0	5475	2	1000	0
5	4	3775	0	0	0

TACTICS

0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0
1	0	0	0	0
258	0	0	0	0
4	0	0	0	0
0	0	0	0	0

COMMANDS
3SIM1617SRPR
2 3

CRACKS

0 0 0 0 0 0 0

SESSION N1.
QUESTION 1 PART 1
5
10
QUESTION 2 PART 1
5
10
QUESTION 3 PART 1
5
10
QUESTION 4 PART 1
2500
10
QUESTION 5 PART 1
7500
10
QUESTION 5 PART 2
7850
19
QUESTION 6 PART 1
NA
10
QUESTION 6 PART 2
NA
10
QUESTION 6 PART 3
Y
5
QUESTION 6 PART 4
N
5
QUESTION 6 PART 5
NA
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
NA
10

SESSION N2.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
NA
10
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
NA
10
QUESTION 5 PART 1
N
10
QUESTION 5 PART 2
Y
10
QUESTION 6 PART 1
ALL OTHERS
10
QUESTION 7 PART 1
Y TO REPAIR HOLES
10
QUESTION 7 PART 2
NO NOT POSSIBLE
10
QUESTION 7 PART 3
REPAIRED TWO HOLES
10
QUESTION 8 PART 1
NA
10

SESSION N3.

1	0	16484	0	2500	0
1	1	18914	0	1500	0
0	0	16204	0	0	0
0	0	16228	0	0	0
3	0	4660	3	2500	0
7	5	4791	0	0	0

TACTICS

1	0	0	4	0
250	0	0	0	0
2	0	0	0	0
1	0	0	3	0
1	0	0	0	0
258	0	0	0	0
4	0	0	0	0
1	0	0	0	0

COMMANDS
RGG2SMD43S23

CRACKS

0 0 0 0 0 0 0

SESSION N4.

0	0	15207	0	2500	0
1	1	17809	0	2250	0
0	1	15072	0	0	0
1	0	16876	0	0	0
3	0	3460	3	3000	0
8	6	5011	2	0	0

TACTICS

1	0	0	4	0
250	0	0	0	0
2	0	0	0	0
1	0	0	3	0
1	2	0	0	0
258	250	0	0	0
4	8	0	0	0
2	1	0	0	0

COMMANDS
6MIS416771MM
2 3 2

CRACKS

0 0 0 0 0 0 0

SESSION N3.
QUESTION 1 PART 1
1
10
QUESTION 2 PART 1
TWO
10
QUESTION 3 PART 1
35
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
A C D
10
QUESTION 6 PART 1
Y TO REPAIR HOLE
10
QUESTION 6 PART 2
YES TO GET ENERGY
10
QUESTION 6 PART 3
MEND HOLE,DOCKED,MADE HOLE.
10
QUESTION 7 PART 1
INCREASE
10
QUESTION 8 PART 1
MORE
10

SESSION N4.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
1500
10
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
N
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 4
N
10
QUESTION 4 PART 5
NA
10
QUESTION 5 PART 1
N
10
QUESTION 5 PART 2
Y
10
QUESTION 6 PART 1
Y
10
QUESTION 6 PART 2
U
10
QUESTION 6 PART 3
N
10
QUESTION 7 PART 1
A C D
10
QUESTION 8 PART 1
Y TO GET TO BETTEER POSITION
10
QUESTION 8 PART 2
YES
10
QUESTION 8 PART 3
INVESTED USED TACTICS KILLED
10

SESSION N5.

0	0	13876	0	2500	0
1	1	16781	0	4250	0
0	1	13538	0	0	0
0	1	15468	0	0	0
3	0	3189	4	3500	0
9	6	2161	1	0	0

TACTICS

1	2	0	4	0
250	250	0	0	0
2	6	0	0	0
1	0	0	4	0
1	2	0	0	0
258	250	0	0	0
4	8	0	0	0
2	1	0	0	0

COMMANDS
0MM211432G23

CRACKS

0 1 0 0 0 0 4

SESSION N6.

1	1	12857	13529	5000	0
1	1	19968	20418	5750	0
1	1	13981	12969	3000	0
0	1	14020	14826	0	0
3	0	4151	4	3500	0
9	6	4115	1	0	0

TACTICS

1	2	0	4	0
250	250	0	0	0
2	6	0	0	0
2	1	0	4	0
1	2	0	0	0
258	250	0	0	0
4	8	0	0	0
3	1	0	0	0

COMMANDS
2SMMS2DMI266
9 32

CRACKS

0 1 0 0 0 0 4

SESSION N5.
QUESTION 1 PART 1
1
10
QUESTION 2 PART 1
N
10
QUESTION 2 PART 2
N
10
QUESTION 3 PART 1
Y
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
N
5
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
PROBABLY CDA
7
QUESTION 6 PART 1
Y TO HELP MEND CRACK
10
QUESTION 6 PART 2
Y
10
QUESTION 6 PART 3
MADE CRACK,TRY REPAIR,KILLED USE TACTIC.
10
QUESTION 7 PART 1
INCREASE
10
QUESTION 8 PART 1
NA
10

SESSION N6.
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
NONE
10
QUESTION 3 PART 1
4500
10
QUESTION 3 PART 2
4200
10
QUESTION 4 PART 1
35
10
QUESTION 5 PART 1
Y TO HELP STARBASE ECONOMY
10
QUESTION 5 PART 2
Y TO GET ENERGY
10
QUESTION 5 PART 3
GOT INFO,USE TACTICS,HELP BASES.
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
24000
5

SESSION N7.

0	0	11781	13529	5000	0
1	1	18525	20418	6250	0
1	1	12655	12969	4000	0
0	0	12626	14826	0	0
3	0	1251	4	5000	0
10	6	5124	1	0	0

TACTICS

1	2	3	4	0
250	250	0	0	0
2	6	0	0	0
2	2	1	4	0
1	2	3	0	0
258	250	0	0	0
4	8	0	0	0
4	1	1	0	0

COMMANDS
177147ISGGGM

CRACKS

0 1 0 0 0 0 4

SESSION N8.

0	1	10641	11389	5000	0
1	1	18303	19128	9750	0
1	1	11152	11941	8500	0
1	1	15541	12292	2500	0
3	0	2855	4	5500	0
10	6	6191	1	0	0

TACTICS

1	2	3	4	0
250	250	0	0	0
2	6	0	0	0
2	3	2	4	0
1	2	3	0	0
258	250	0	0	0
4	8	0	0	0
4	2	1	0	0

COMMANDS
M2SGD6667ISM
329

CRACKS

0 1 0 0 0 0 4

SESSION N7.
QUESTION 1 PART 1
4
10
QUESTION 2 PART 1
4500
5
QUESTION 2 PART 2
5200
5
QUESTION 3 PART 1
3
5
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
N
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 4
N
10
QUESTION 4 PART 5
N
10
QUESTION 5 PART 1
A C D
10
QUESTION 6 PART 1
Y TO KILL KLINGONS
10
QUESTION 6 PART 2
YES FOR ENERGY
10
QUESTION 6 PART 3
BOUGHT TACTIC,USE TO KILL,INVESTED
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
34000
10

SESSION N8.
QUESTION 1 PART 1
N
10
QUESTION 1 PART 2
N
10
QUESTION 2 PART 1
Y
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
Y
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 5 PART 1
Y TO KILL KLINGONS AND INVEST
10
QUESTION 5 PART 2
TO HELP ECONOMY AND GET ENERGY
10
QUESTION 5 PART 3
TACTICS,INVEST,INFO ON KLINGS.
10
QUESTION 6 PART 1
INCREASE
10
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
NA
10

SESSION N9.

0	1	9357	11389	5000	0
0	1	17293	19128	9750	0
1	0	10128	11941	12500	0
1	0	15530	12292	2500	0
3	0	2955	4	7000	0
11	7	3391	1	0	0

TACTICS

1	2	3	4	0
250	250	0	0	0
2	6	0	0	0
2	3	2	4	0
1	2	3	4	0
25R	250	0	0	0
4	8	0	0	0
4	2	2	1	0

COMMANDS
MMIS17MDR27S
9

CRACKS

0 1 0 0 0 0 4

110

SESSION N10.

0	1	8373	11389	5000	0
0	1	15975	19128	9750	0
0	1	8880	11941	12500	0
1	0	24250	12292	2700	0
3	0	7079	5	8500	0
11	7	2141	1	0	0

TACTICS

1	2	3	4	0
250	250	0	0	0
2	6	0	0	0
2	3	3	5	0
1	2	3	4	0
258	250	0	0	0
4	8	0	0	0
4	3	3	1	0

COMMANDS
RM2772GMMMMM

CRACKS

0 1 0 0 0 0 4

SESSION N9.
QUESTION 1 PART 1
35
10
QUESTION 2 PART 1
Y
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
NA
10
QUESTION 3 PART 3
Y0
10
QUESTION 3 PART 4
N
10
QUESTION 3 PART 5
NA
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
Y TO REPAIR HOLE
10
QUESTION 5 PART 2
Y TO OBTAIN ENERGY FOR SPACESHIP
10
QUESTION 5 PART 3
K'LLED KLINGS,MADE HOLE,TRY REPAIR.
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
13000
10
QUESTION 8 PART 1
MEND HOLE KLL KLINGONS TRY TO INVEST
10

SESSION N10.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
N
10
QUESTION 2 PART 2
N
10
QUESTION 3 PART 1
N
10
QUESTION 3 PART 2
Y
10
QUESTION 4 PART 1
TO KILL KLINGOND AND TO INVEST
10
QUESTION 4 PART 2
TO GET ENERGY
10
QUESTION 4 PART 3
MIXED X AND Y DOCKING AT BASE D.
10
QUESTION 5 PART 1
INCREASE
10
QUESTION 6 PART 1
12400
10
QUESTION 7 PART 1
DOCK Y AT D,INVEST AT D.
10
QUESTION 8 PART 1
A KIND OF AMOEBA LIKE CREATURE
10

SESSION N11.

1	1	7116	8331	11600	0
0	1	14263	15908	9750	0
0	1	7571	8776	12500	0
1	1	23094	24225	4200	0
3	0	2462	5	9500	0
11	7	6247	1	0	0

TACTICS

1	2	3	4	0
250	250	0	0	0
2	6	0	0	0
4	3	5	5	0

1	2	3	4	0
258	250	0	0	0
4	8	0	0	0
4	3	3	1	0

111

COMMANDS
26SMIMGMGGMM

CRACKS

0 1 9 0 0 0 4

SESSION N11.
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
2
10
QUESTION 3 PART 1
4020
10
QUESTION 3 PART 2
6627
10
QUESTION 4 PART 1
Y
10
QUESTION 4 PART 2
10Y
10
QUESTION 4 PART 3
N
10
QUESTION 5 PART 1
Y TO TRY TO HELP STRABASE A
10
QUESTION 5 PART 2
FOR THE SME REASON
10
QUESTION 5 PART 3
KILLED KLINGONS TEREID TO
STABLISED ECONOMY
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
CKECK A ECONOMY,TRY KILL MORE.
10
QUESTION 8 PART 1
EITHER N AMOEBALIKE CREATURE ORA PATTERN
10

RECORD 3

SESSION N1.

1	1	20220	0	500	0
0	1	19211	0	0	0
0	0	18567	0	0	0
1	0	21875	0	450	0
3	0	6450	0	500	0
0	0	11514	0	500	0

TACTICS

0	2	3	4	0
0	1000	0	0	0
0	2	0	0	0
0	2	0	9	0
0	2	3	4	0
0	1000	0	0	0
0	0	0	0	0
0	1	0	0	0

COMMANDS
GGG7727MS2MM

CRACKS

0 0 0 0 0 0 0

SESSION N2.

1	1	18742	20220	500	0
0	1	18319	19211	0	0
0	1	17593	18567	0	0
0	1	20540	21875	450	0
3	0	6305	0	2000	0
0	0	11514	0	500	0

TACTICS

0	2	3	4	0
0	1000	0	0	0
0	2	0	0	0
0	3	2	0	0
0	2	3	4	0
0	1000	0	0	0
0	0	0	0	0
0	1	0	0	0

COMMANDS
IIMGMMMGMG
92

CRACKS

0 0 0 0 0 0 0

SESSION N1.

QUESTION 1 PART 1
0
9
QUESTION 2 PART 1
0
9
QUESTION 3 PART 1
6
9
QUESTION 4 PART 1
1000
5
QUESTION 5 PART 1
X JUST REFUELLED NA
9
QUESTION 5 PART 2
11600
6
QUESTION 6 PART 1
NA
1
QUESTION 6 PART 2
NA
1
QUESTION 6 PART 3
NA
INA
QUESTION 6 PART 4
NA
1
QUESTION 6 PART 5
NA
1
QUESTION 7 PART 1
2
1
QUESTION 8 PART 1
NA
1

SESSION N2.
QUESTION 1 PART 1
DIDNT COUNT
9
QUESTION 2 PART 1
500 THIS TIME ROUND
9
QUESTION 3 PART 1
THINK 3
6
QUESTION 4 PART 1
N
5
QUESTION 4 PART 2
Y
-
QUESTION 5 PART 1
N
9
QUESTION 5 PART 2
Y
9
QUESTION 6 PART 1
THINK B C D
7
QUESTION 7 PART 1
YES,REFUEL,DESTROY
WITHOUT MAKING HOLES.
9
QUESTION 7 PART 2
Y
9
QUESTION 7 PART 3
KILLED,REFUELLED,
TRACKED FREIGHTERS.
9
QUESTION 8 PART 1
19000
7

```
SESSION N3.
 1          1          19464      18266      500        0
 0          1          16914      17767      0          0
 0          1          16204      17130      0          0
 1          1          19228      20210      450        0
 3          0          3605       0          3000       0
 0          0          7614       0          1500       0

TACTICS

 0          2          3          4          0
 0          1000       0          0          9
 0          2          0          0          0
 0          4          5          0          0


 0          2          3          4          0
 0          1000       0          0          0
 0          5          0          0          0
 0          1          1          0          0



COMMANDS
GMGM6MSIGM71
    9

CRACKS

 0   0   0   0   0   0   0
```



```
SESSION N4.
 0          1          18207      19264      500        0
 0          1          15809      16548      0          0
 0          1          15072      15832      0          0
 0          1          17876      18855      450        0
 3          0          3605       0          3000       0
 1          0          1264       0          2500       0

TACTICS

 0          2          3          4          0
 0          1000       0          0          0
 0          2          0          0          0
 0          4          5          0          0


 0          2          3          4          0
 0          1000       0          0          0
 0          5          0          0          0
 0          1          3          0          0



COMMANDS
71666117141?
  231

CRACKS

 0   0   0   0   0   0   0
```

```
SESSION N3.
QUESTION  1   PART  1
THINK 12
6
QUESTION  2   PART  1
STILL THINK 3
6
QUESTION  3   PART  1
3
7
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
Y
9
QUESTION  4   PART  3
N
9
QUESTION  5   PART  1
B C D
7
QUESTION  6   PART  1
YES,KILL KLINGONS IF MORE
THAN TWO IN A SCAN.
9
QUESTION  6   PART  2
NOT THIS TIME ROUND
9
QUESTION  6   PART  3
FIND FREIGHTERS,KILLKLINGONS.
9
QUESTION  7   PART  1
DONT KNOW,GUESS DECREASE
7
QUESTION  8   PART  1
17000 ABOUT
9
```

```
SESSION N4.
QUESTION  1   PART  1
DIDNT COUNT SORRY
9
QUESTION  2   PART  1
1000
7
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
N
9
QUESTION  4   PART  1
Y
9
QUESTION  4   PART  2
N
9
QUESTION  4   PART  3
N
9
QUESTION  4   PART  4
N
9
QUESTION  4   PART  5
N
9
QUESTION  5   PART  1
N
9
QUESTION  5   PART  2
Y
9
QUESTION  6   PART  1
N
9
QUESTION  6   PART  2
Y
9
QUESTION  6   PART  3
N
9
QUESTION  7   PART  1
B C D
7
QUESTION  8   PART  1
YES,KILL TO GUARD TRADE
9
QUESTION  8   PART  2
NOT THIS TIME
9
QUESTION  8   PART  3
CLEARING TRADE ROUTES.
9
```

SESSION N5.

0	1	16876	17912	500	0
0	1	14781	15565	0	0
1	1	16538	14644	779	0
1	1	16468	17375	1450	0
3	0	3605	0	3000	0
3	0	1218	0	4000	0

TACTICS

0	2	3	4	0
0	1000	0	0	0
0	2	0	0	0
0	4	5	0	0
1	2	3	4	0
1000	1000	0	0	0
6	8	0	0	0
1	2	3	0	0

COMMANDS
717766114141
21

CRACKS

0 0 0 0 0 0 0

SESSION N6.

0	1	15857	16451	500	0
0	1	13968	14268	0	0
1	1	15981	16712	797	0
1	1	15020	15614	4267	0
3	0	3205	0	3000	0
5	0	2120	0	5000	0

TACTICS

0	2	3	4	0
0	1000	0	0	0
0	2	0	0	0
0	4	5	0	0
1	2	3	4	0
1000	1000	0	0	0
6	8	0	0	0
2	3	4	0	0

COMMANDS
471145261171
9

CRACKS

0 0 0 0 0 0 0

SESSION N5.
QUESTION 1 PART 1
6 I THINK
7
QUESTION 2 PART 1
N
9
QUESTION 2 PART 2
N
9
QUESTION 3 PART 1
NO!
10
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 5 PART 1
B C D
9
QUESTION 6 PART 1
YES,REFUEL,INVEST TO MOVE
ACROSS TO ANOTHER BASE.
9
QUESTION 6 PART 2
YES,TO TRY AND BOOST BASE ENERGY
9
QUESTION 6 PART 3
REFUEL,INVEST,CHASE FREIGHTERS
KILL MORE KLINGIONS.
9
QUESTION 7 PART 1
INCREASE I THINK
7
QUESTION 8 PART 1
STUFF AND NONSENSE
10

SESSION N6.
QUESTION 1 PART 1
9 ABOUT.
7
QUESTION 2 PART 1
1000
7
QUESTION 3 PART 1
3000
8
QUESTION 3 PART 2
2000
8
QUESTION 4 PART 1
3
7
QUESTION 5 PART 1
YES.TO REFUEL,
9
QUESTION 5 PART 2
YES. TO OFFLOAD SURPLUS ENERGY
9
QUESTION 5 PART 3
LOCATED MORE KLINGONS,REFUELLED,
FOLLOWED FREIGHTERS.
9
QUESTION 6 PART 1
2
6
QUESTION 7 PART 1
1
3
QUESTION 8 PART 1
18000
5

```
SESSION N7.
 1          1          16781      15857      1255       0
 1          1          13525      13968      0          0
 0          1          14655      15981      797        0
 0          1          13626      15020      4767       0
 3          1          4081       0          3000       0
 5          0          3232       0          6000       0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          2          0          0          0
 0          5          5          0          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          4          5          0          0



COMMANDS
M17176IMGMMI
     23    9
CRACKS

 0   0   0   0   0   0   0
```



```
SESSION N8.
 0          1          15641      16546      1255       0
 1          1          13303      13365      182        0
 0          1          13152      14448      797        0
 0          1          12541      13586      4767       0
 3          1          2081       0          3500       0
 8          0          1132       0          7500       0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          2          0          0          0
 0          5          5          0          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          4          6          0          0



COMMANDS
MDIISI417141
  93

CRACKS

 0   0   0   0   0   0   0
```

```
SESSION N7.
QUESTION  1   PART  1
ABOUT 5
7
QUESTION  2   PART  1
200
6
QUESTION  2   PART  2
3000
6
QUESTION  3   PART  1
3
7
QUESTION  4   PART  1
Y
9
QUESTION  4   PART  2
N
9
QUESTION  4   PART  3
N
9
QUESTION  4   PART  4
N
9
QUESTION  4   PART  5
N
9
QUESTION  5   PART  1
B C D
9
QUESTION  6   PART  1
YES,TO REFUEL AND MOVE IN A
BIG JUMP FROM BASE TO BASE.
9
QUESTION  6   PART  2
YES
9
QUESTION  6   PART  3
INVESTED COS I WANTED TO.
TRY TO FIND THE ELUSIVE KLINGS.
9
QUESTION  7   PART  1
2
2
QUESTION  8   PART  1
15000
8
```

```
SESSION N8.
QUESTION  1   PART  1
N
9
QUESTION  1   PART  2
N
9
QUESTION  2   PART  1
NO!
10
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
Y
9
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
YES
9
QUESTION  5   PART  1
YES,TO PROTECT TRADE BY KILLING
CONCENTRATINS OF KLINGS.
9
QUESTION  5   PART  2
YES,TO SEE IF BASE ENERGY GOES UP
9
QUESTION  5   PART  3
HUNTED KLINGONS,GUARDED FREIGHTEERS
9
QUESTION  6   PART  1
INCREASE
8
QUESTION  7   PART  1
PLEASE DONT ASK ME AGAIN!
1
QUESTION  8   PART  1
1
1
```

```
SESSION N9.
 1          1          17357      17362      1286       0
 0          1          12203      12850      182        0
 0          1          12128      12717      797        0
 1          1          12538      12292      4799       0
 3          1          4490       0          3500       0
 8          0          2494       0          7500       0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          2          0          0          0
 0          6          5          0          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          6          6          0          0


COMMANDS
MGMIIS72M116
   93      2

CRACKS

 0   0   0   0   0   0   0


SESSION N10.
 1          1          17373      18066      1726       0
 0          1          10975      11785      182        0
 0          1          10880      11527      797        0
 1          1          16250      14976      4899       0
 3          1          8118       0          3500       0
 9          0          2038       0          8500       0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          2          0          0          0
 0          6          5          0          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          7          6          0          0


141S261S2161
     7    2

CRACKS

 0   0   0   0   0   0   0
```



```
SESSION N9.
QUESTION  1   PART  1
3
8
QUESTION  2   PART  1
NO!
9
QUESTION  3   PART  1
Y
9
QUESTION  3   PART  2
N
9
QUESTION  3   PART  3
N
9
QUESTION  3   PART  4
N
9
QUESTION  3   PART  5
N
8
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
Y
9
QUESTION  4   PART  3
N
9
QUESTION  5   PART  1
YES,REFUEL,TO VISIT
9
QUESTION  5   PART  2
YES,TO SEE WHAT HAPPENS
9
QUESTION  5   PART  3
GOT LOST,KILLED,
9
QUESTION  6   PART  1
PLEASE GO AWAY
1
QUESTION  7   PART  1
1800 I GUESS
8
QUESTION  8   PART  1
LOCATE AND DESTROY BY
USE OF TACTIC 3.
9
```

```
SESSION N10.
QUESTION  1   PART  1
FORGOTTEN
7
QUESTION  2   PART  1
N
9
QUESTION  2   PART  2
N
9
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
YES GORDON PASK.
9
QUESTION  4   PART  1
YES TO REFUEL
9
QUESTION  4   PART  2
YES,I GET RID OF ODD SUMS.
9
QUESTION  4   PART  3
GOT LOST AGAIN
9
QUESTION  5   PART  1
INCREASE
8
QUESTION  6   PART  1
19000
7
QUESTION  7   PART  1
SEEK KLINGONS, DONT GET LOST.
9
QUESTION  8   PART  1
CANT RECALL,SORRY
9
```

```
SESSION N11.
 0          1          16116      16347      1726       0
 0          1          9263       9634       182        0
 0          1          9571       10844      797        0
 0          1          15094      15208      4899       0
 3          1          3618       0          4588       0
 10         0          1738       0          8588       0

TACTICS

 1          2          3          4          0
 1588       1000       0          0          0
 4          2          0          0          0
 0          6          7          1          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          7          6          0          0



COMMANDS
421IMMGMGIGM
  97

CRACKS

 0   0   0   0   0   0   0
```



```
SESSION N12.
 0          1          14705      15933      1726       0
 1          1          10297      9108       182        0
 0          1          8301       9316       797        0
 1          1          13678      14928      5399       0
 3          3          1018       0          4588       0
 10         0          3002       0          9000       0

TACTICS

 1          2          3          4          0
 1588       1000       0          0          0
 4          4          0          2          0
 0          6          7          1          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          9          7          0          0



COMMANDS
215117M1S72
   7   9
CRACKS

 0   0   0   0   0   0   0
```

```
SESSION N11.
QUESTION  1   PART  1
LOAT LOST COUNT
9
QUESTION  2   PART  1
A FEW!
4
QUESTION  3   PART  1
4000
6
QUESTION  3   PART  2
3000
7
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
Y
9
QUESTION  4   PART  3
N
9
QUESTION  5   PART  1
YES TO REFUEL AFTER DOCK
9
QUESTION  5   PART  2
YES
TO EVEN OUT SHIP ENENRGY
QUESTION  5   PART  3
STILL GOT LOST BUT KILLED A FEW!
9
QUESTION  6   PART  1
NOT AGAIN
9
QUESTION  7   PART  1
TRY NOT TO GET LOST!
9
QUESTION  8   PART  1
ODD PATTERNS
9
```

```
SESSION N12.
QUESTION  1   PART  1
3
5
QUESTION  2   PART  1
GOD NO!
10
QUESTION  3   PART  1
N
8
QUESTION  3   PART  2
Y
9
QUESTION  4   PART  1
YES AS BEFORE
9
QUESTION  4   PART  2
YES DONT KNOW
9
QUESTION  4   PART  3
KILLED,REFUELED AFTER DOCK
9
QUESTION  5   PART  1
FIND KLINGONS AND KILL!
9
QUESTION  6   PART  1
MUST TRY TO RECALL
9
QUESTION  7   PART  1
11
5
QUESTION  8   PART  1
1700
4
```

SESSION N13.

0	1	13494	14705	1726	0
1	1	9243	10297	182	0
0	1	7035	8301	797	0
0	1	12380	13678	5451	0
3	3	1018	0	4500	0
11	0	1105	0	9500	0

TACTICS

1	2	3	4	0
1500	1000	0	0	0
4	4	0	0	0
0	6	7	1	0

1	2	3	4	0
1000	1000	0	0	0
6	8	0	0	0
2	10	7	0	0

COMMANDS
666117116146
912 3 7

CRACKS

0 0 0 0 0 0 0

SESSION N14.

1	1	12097	13494	1726	0
0	1	8399	9243	200	0
0	1	5973	7035	797	0
0	1	11338	12380	5484	0
3	4	2515	1	4500	0
12	1	3572	0	10500	0

TACTICS

1	2	3	4	0
1500	1000	0	0	0
4	4	0	0	0
1	6	7	2	0

1	2	3	4	0
1000	1000	0	0	0
6	8	0	0	0
2	12	8	0	0

COMMANDS
6671714SR2MI
79 3

CRACKS

1 0 0 0 0 1 0

SESSION N13.
QUESTION 1 PART 1
1
9
QUESTION 2 PART 1
1
9
QUESTION 3 PART 1
3
9
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
N
9
QUESTION 5 PART 1
YES, TO VISIT DOCK AND REFUEL
9
QUESTION 5 PART 2
YES, TO ROUND OFF MY ENERGY
9
QUESTION 5 PART 3
MOVED, DESTROYED, DOCKED
9
QUESTION 6 PART 1
LOCATE AND DESTROY
9
QUESTION 7 PART 1
SEEMS LIKE TANK WITH LONG GUN.
9
QUESTION 8 PART 1
2
9

SESSION N14.
QUESTION 1 PART 1
2
7
QUESTION 2 PART 1
1000
8
QUESTION 3 PART 1
N
9
QUESTION 4 PART 1
Y
9
QUESTION 4 PART 2
N
9
QUESTION 4 PART 3
N
9
QUESTION 4 PART 4
N
9
QUESTION 4 PART 5
N
9
QUESTION 5 PART 1
YES, TO DOCK AND REFUEL
9
QUESTION 5 PART 2
YES, TO ROUND OFF MY ENERGY
9
QUESTION 5 PART 3
LOCATED AND KILLED
9
QUESTION 6 PART 1
MOVE TO BASE C AREA AND KILL
9
QUESTION 7 PART 1
MARKIV TANKS 75MM GUNS.
9
QUESTION 8 PART 1
1600
6

```
SESSION N15.
 0          1          11027      12697      1726       0
 0          1          7438       8399       900        0
 0          1          4775       5973       797        0
 1          1          10279      11338      6464       0
 3          4          786        1          5500       0
 12         1          2972       0          10500      0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          4          0          0          0
 1          7          8          2          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          12         8          0          0


COMMANDS
IMMMGMIIGM
7     39

CRACKS

 0   0   0   0   0   0   0


SESSION N16.
 1          1          10008      10654      1726       0
 1          1          7306       8022       1488       0
 0          1          3635       4358       797        0
 1          1          9215       10064      6464       0
 3          5          500        1          5500       0
 12         1          1372       0          10500      0

TACTICS

 1          2          3          4          0
 1500       1000       0          0          0
 4          4          0          0          0
 2          8          9          2          0


 1          2          3          4          0
 1000       1000       0          0          0
 6          8          0          0          0
 2          12         8          0          0


COMMANDS
GS12IISMMIIG
    78    39

CRACKS

 0   3   0   3   0   0   3
```



```
SESSION N15.
QUESTION  1   PART  1
1900
7
QUESTION  1   PART  2
3000
5
QUESTION  2   PART  1
2
9
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
Y
9
QUESTION  3   PART  3
N
9
QUESTION  4   PART  1
B C D
9
QUESTION  5   PART  1
Y TO DOCK AND REFUEL
9
QUESTION  5   PART  2
Y TO OFF LOAD ODD ENERGY
9
QUESTION  5   PART  3
HUNTED AND KILLED
9
QUESTION  6   PART  1
---- OFF!
10
QUESTION  7   PART  1
WIPE OUT KLINGONS AT C
9
SAME OLD TANK,MOVING.
STILL THE SAME OLD MARK IV TANK
3
```

```
SESSION N16.
QUESTION  1   PART  1
3
9
QUESTION  2   PART  1
N
9
QUESTION  2   PART  2
YES,PASK OR HIS COLLEGUES
9
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
Y
9
QUESTION  4   PART  1
YES, TO REGAIN SOME ENERGY
9
QUESTION  4   PART  2
YES, ONLY THE ODD AMMOUNT
9
QUESTION  4   PART  3
FOUND KLINGS AND MASSACRED
9
QUESTION  5   PART  1
DECREASE
9
QUESTION  6   PART  1
1200
9
QUESTION  7   PART  1
PLAN TO CLEAN UP AROUND C.
9
QUESTION  8   PART  1
THE AFRIKA KORPS BUT NO ROMMEL
9
```

RECORD 4

SESSION N1.

0	1	19220	19914	0	0
0	1	19211	19695	0	0
0	1	18567	19724	0	0
0	1	18875	19707	0	0
3	0	6850	0	1500	0
4	0	8700	1	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

COMMANDS
266IDD3DSMDD
293

CRACKS

0 1 0 0 0 0 4

0	0	17742	19914	0	0
0	0	18319	19695	0	0
0	1	17593	19724	0	0
0	1	17540	19707	0	0
3	0	3400	1	3000	0
5	1	6800	1	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	0

COMMANDS
5773M33MD6MM
2

CRACKS

0 1 0 0 0 3 4

SESSION N1

QUESTION 1 PART 1
4
9
QUESTION 2 PART 1
5
9
QUESTION 3 PART 1
5
9
QUESTION 4 PART 1
1000
5
QUESTION 5 PART 1
6000
4
QUESTION 5 PART 2
5000
4
QUESTION 6 PART 1
Y
7
QUESTION 6 PART 2
N
5
QUESTION 6 PART 3
N
5
QUESTION 6 PART 4
N
5
QUESTION 6 PART 5
N
5
QUESTION 7 PART 1
6%
5
QUESTION 8 PART 1
NA

SESSION N2

QUESTION 1 PART 1
6
9
QUESTION 2 PART 1
500
6
QUESTION 3 PART 1
3
4
QUESTION 4 PART 1
N
6
QUESTION 4 PART 2
Y
8
QUESTION 5 PART 1
N
9
QUESTION 5 PART 2
YES
9
QUESTION 6 PART 1
A B D
6
QUESTION 7 PART 1
YES,TO HELP REPAIR CRACK
9
QUESTION 7 PART 2
N
9
QUESTION 7 PART 3
REPAIR HOLES,DESTROY,MANOEUC
9
QUESTION 8 PART 1
17000
3

SESSION N3

1	1	19484	17742	600	0
0	1	16914	18319	0	0
0	1	16204	17593	0	0
0	1	16228	17540	0	0
3	0	3628	2	4000	0
6	2	3850	1	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0

COMMANDS
6713MIMDMMIM
9 2

CRACKS

0 1 0 0 0 0 4

SESSION N4

0	1	18207	17742	600	0
1	1	19809	18319	878	0
0	1	15872	17593	0	0
0	0	14876	17540	0	0
3	0	5066	3	5500	0
9	4	2400	2	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0

COMMANDS
5D7MRMDM7414

CRACKS

0 1 0 1 0 0 5

SESSION N3
QUESTION 1 PART 1
2
6
QUESTION 2 PART 1
3
4
QUESTION 3 PART 1
4
5
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
YES
9
QUESTION 4 PART 3
N
9
QUESTION 5 PART 1
B C D
7
QUESTION 6 PART 1
YES, TO JOIN SHIPS FOR REPAIR
9
QUESTION 6 PART 2
YES, TO SAVE FOR A RAINY DAY
9
QUESTION 6 PART 3
DESTROYED GOT LOST CRACKED
9
QUESTION 7 PART 1
DECREASE 1 GUESS.
6
QUESTION 8 PART 1
16000
6

SESSION N4
QUESTION 1 PART 1
3
4
QUESTION 2 PART 1
1000
5
QUESTION 3 PART 1
Y
9
QUESTION 3 PART 2
Y
9
QUESTION 4 PART 1
Y
6
QUESTION 4 PART 2
N
3
QUESTION 4 PART 3
N
9
QUESTION 4 PART 4
N
9
QUESTION 4 PART 5
N
9
QUESTION 5 PART 1
N
8
QUESTION 5 PART 2
Y
7
QUESTION 6 PART 1
N
9
QUESTION 6 PART 2
YES
9
QUESTION 6 PART 3
N
9
QUESTION 7 PART 1
B C D
9
QUESTION 8 PART 1
YES, TOHELP REPAIR
9
QUESTION 8 PART 2
YES TO PUT A BIT IN THE BASE ECONOMY
9
QUESTION 8 PART 3
HOLED REPAIRED DESTROYED
9

SESSION N5

0	1	16876	17742	600	0
1	0	18781	18319	878	0
0	1	13538	17593	0	0
0	1	13468	17540	0	0
3	1	3016	5	6500	0
11	6	500	2	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0

COMMANDS
MDSSRR144111
2

CRACKS

0 1 0 1 0 0 5
1

SESSION N6

0	0	15857	17742	600	0
1	1	17968	18319	878	0
0	1	11981	17593	0	0
1	1	19020	17540	0	0
3	3	3016	5	6500	0
14	6	4493	3	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0

COMMANDS
111144211114

CRACKS

0 1 0 1 1 0 6

SESSION N5
QUESTION 1 PART 1
6
5
QUESTION 2 PART 1
Y
9
QUESTION 2 PART 2
Y
7
QUESTION 3 PART 1
YES
9
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 5 PART 1
B D C
9
QUESTION 6 PART 1
FORGET
0
QUESTION 6 PART 2
N
9
QUESTION 6 PART 3
DESTROY,HOLES,REPAIR
9
QUESTION 7 PART 1
DECREASE
6
QUESTION 8 PART 1
DONT KNOW
0

SESSION N6
QUESTION 1 PART 1
3
6
QUESTION 2 PART 1
1500
7
QUESTION 3 PART 1
3000
6
QUESTION 3 PART 2
4000
6
QUESTION 4 PART 1
2
7
QUESTION 5 PART 1
N
9
QUESTION 5 PART 2
N
9
QUESTION 5 PART 3
MOVED,DOCKED REFUEL,ILL
9
QUESTION 6 PART 1
6%
5
QUESTION 7 PART 1
DONT KNOW
0
QUESTION 8 PART 1
15000
4

SESSION N7

0	1	14781	15646	600	0
0	1	16525	17672	878	0
1	1	12655	13603	3000	0
1	1	17626	18765	0	0
3	3	3016	5	9500	0
17	8	2220	4	0	0

TACTICS

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
0	2	0	4	0

COMMANDS
771666147144
935

CRACKS

1 1 0 1 1 0 8

SESSION N8

0	1	13641	13836	600	0
0	1	15303	15631	878	0
1	1	11152	11449	4500	0
0	1	16541	16707	0	0
3	5	3020	5	10500	0
18	9	1896	4	0	0

TACTICS

0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	1	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
0	3	0	4	0

COMMANDS
2GGD6MMM72I I
2 9

CRACKS

1 1 0 1 1 0 8

SESSION N7

QUESTION 1 PART 1
4
5
QUESTION 2 PART 1
3000
5
QUESTION 2 PART 2
2000
5
QUESTION 3 PART 1
3
6
QUESTION 4 PART 1
8
Y
QUESTION 4 PART 2
N
8
QUESTION 4 PART 3
N
8
QUESTION 4 PART 4
N
8
QUESTION 4 PART 5
N
8
QUESTIO 5 PART 1
B C D
9
QUESTION 6 PART 1
Y
TO DOCK,9
QUESTION 6 PART 2
Y TO HELP THE BASE
9
QUESTION 6 PART 3
KILL,HOLED,REEFUEL
9
QUESTION 7 PART 1
6%
9
QUESTION 8 PART 1
15000
5

SESSION N8

QUESTION 1 PART 1
Y
9
QUESTION 1 PART 2
Y
9
QUESTION 2 PART 1
YES,SORRY.
9
QUESTION 3 PART 1
N
9
QUESTION 3 PART 2
Y
9
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
YES
9
QUESTION 5 PART 1
YES,TOREFUELQUICKLY
9
QUESTION 5 PART 2
YES, TOGET BASE UP.
9
QUESTION 5 PART 3
REFUEL,FIND KLINGONS TO KILL
9
QUESTION 6 PART 1
NOT SURE NOW.
9
QUESTION 7 PART 1
WHAT DOES IT MEAN.
0
QUESTION 8 PART 1
NA
0

SESSION N8

1	1	18357	18652	600	0
0	1	14203	14483	878	0
0	1	10128	10324	6000	0
0	1	15530	15951	0	0
3	5	4508	6	10500	0
19	13	6325	4	0	0

TACTICS

0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
1	4	0	4	0

COMMANDS
471MGRMMIIII
9387

CRACKS

1 1 0 1 1 2 8

SESSION N10

1	1	17373	18213	600	0
0	1	12975	14051	878	0
0	1	8880	10003	6000	0
0	1	14250	15331	0	0
3	5	4723	7	11000	0
20	11	4225	4	0	0

TACTICS

0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
0	4	0	5	0

COMMANDS
MIIIIISMM743
3952

CRACKS

1 0 8

SESSION N9

QUESTION 1 PART 1
2
5
QUESTION 2 PART 1
YES
9
QUESTION 3 PART 1
Y
8
QUESTION 3 PART 2
N
4
QUESTION 3 PART 3
N
9
QUESTION 3 PART 4
N
9
QUESTION 3 PART 5
N
3
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 5 PART 1
YES,TOREPAIR,REFUUEL
9
QUESTION 5 PART 2
NO,WANTED ALLENERGY TO GET AT KLINGONS WITH.
9
QUESTION 5 PART 3
REPAIRED HOLES KILLED
9
QUESTION 6 PART 1
NO IDEA.
0
QUESTION 7 PART 1
16000
5
QUESTION 8 PART 1
STOP KLINKONSS FROM KILLING MY FREIGHTERS
9

SESSION N10

QUESTION 1 PART 1
1
9
QUESTION 2 PART 1
Y
9
QUESTION 2 PART 2
Y
9
QUESTION 3 PART 1
N
9
QUESTION 3 PART 2
Y
9
QUESTION 4 PART 1
YES,TO JOIN UPSHIPS AND REPAIR
9
QUESTION 4 PART 2
NO I NEED MY ENERGY TO KLL
9
QUESTION 4 PART 3
KILL,HOLED MANOUVER.
9
QUESTION 5 PART 1
DECREASE
6
QUESTION 6 PART 1
17000
7
QUESTION 7 PART 1
WORK OUT TRADE ROUTES AND KILL KS ON THEM
9
QUESTION 8 PART 1
QUATERMASS OBJECTS
9

SESSION N11

0	1	16116	16267	600	0
0	1	11263	11583	878	0
1	1	10571	10902	6000	0
0	1	13094	13183	0	0
3	5	9131	9	11000	0
20	11	3625	4	0	0

TACTICS

1	0	0	4	0
2500	0	0	0	0
6	0	0	0	0
1	0	0	2	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
0	4	0	5	0

COMMANDS
ISIRRIGGMMII
9 4 4 9

CRACKS

1 1 0 1 1 0 8

SESSION N12

0	1	14705	15033	600	0
0	1	10297	10615	878	0
1	1	11301	11581	6000	0
0	1	11678	12026	0	0
3	5	11615	9	11500	0
21	11	9604	4	0	0

TACTICS

1	0	0	4	0
2500	0	0	0	0
6	0	0	0	0
1	0	0	2	0
0	2	0	4	0
0	2000	0	0	0
0	6	0	0	0
0	5	0	5	0

COMMANDS
71662IMI1614
99 9 9

CRACKS

1 [illegible]

SESSION N11

QUESTION 1 PART 1
0
5
QUESTION 2 PART 1
0
9
QUESTION 3 PART 1
9000
6
QUESTION 3 PART 2
4000
6
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 5 PART 1
YES TOMOVE TO BASEE TO REDFUEL
9
QUESTION 5 PART 2
NO
9
QUESTION 5 PART 3
REPAIR HOLES FOR TRADE,
9
QUESTION 6 PART 1
CANT BEGIN TO GUESS
9
QUESTION 7 PART 1
REPAIR ALL OLES THEN START ON CRACKS
9
QUESTION 8 PART 1
WEIRD PATTERNS
9

SESSION N12

QUESTION 1 PART 1
2
99
QUESTION 2 PART 1
YES
9
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 2
YES
9
QUESTION 4 PART 1
YES TO DOCK ND REFUEL
9
QUESTION 4 PART 2
NO,I NEED MY ENERGY
0
QUESTION 4 PART 3
REFUEL,INFO,KILL
9
QUESTION 5 PART 1
FINISH MEND HOLES
7
QUESTION 6 PART 1
STILLPUULSIG PATTERNS
9
QUESTION 7 PART 1
DONT KNOW
0
QUESTION 8 PART 1
15000
3

SESSION N13

1	1	15494	15033	600	0
0	0	9243	10615	878	0
0	1	10035	11581	6000	0
0	1	10380	12026	0	0
3	5	10415	10	13000	0
23	11	5104	5	0	0

TACTICS

1	0	0	4	0
2500	0	0	0	0
6	0	0	0	0
1	0	0	3	0

0	2	3	4	0
0	2000	0	0	0
0	6	0	0	0
0	5	0	5	0

COMMANDS
241GDR7R1111

CRACKS

1 1 0 1 1 0 12

SESSION N14

0	1	14097	14372	600	0
1	1	8399	8497	878	0
0	1	8973	9174	6000	0
0	1	9338	9488	0	0
3	5	11246	10	13000	0
23	11	4054	5	0	0

TACTICS

1	2	0	4	0
2500	2900	0	0	0
6	4	0	0	0
1	1	0	3	0

0	2	3	4	0
0	2000	0	0	0
0	6	0	0	0
0	5	0	5	0

COMMANDS
IIIIGG2MIMII
921 9 93

CRACKS

Session N.13

QUESTION 1 PART 1
1
3
QUESTION 2 PART 1
1
9
QUESTION 3 PART 1
3
9
QUESTION 4 PART 1
YES
9
QUESTION 4 PART 2
NOT THIS GO ROUND
9
QUESTION 5 PART 1
YES TO GET SHIPS TOGETHER
9
QUESTION 5 PART 2
N
9
QUESTION 5 PART 3
KILL,MEND SEARCH
9
QUESTION 6 PART 1
SEW UP HOLES AND CRACKS
9
QUESTION 7 PART 1
CHICKENS
6
QUESTION 8 PART 1
6%
6

Session N14

QUESTION 1 PART 1
0
9
QUESTION 2 PART 1
0
9
QUESTION 3 PART 1
YES
9
QUESTION 4 PART 1
Y
9
QUESTION 4 PART 2
N
9
QUESTION 4 PART 3
N
9
QUESTION 4 PART 4
N
9
QUESTION 4 PART 5
N
9
QUESTION 5 PART 1
YES,TO REFUEL
9
QUESTION 5 PART 2
N
9
QUESTION 5 PART 3
GAINED INFO,REFUEL.
9
QUESTION 6 PART 1
KILL
9
QUESTION 7 PART 1
PULSING CHICKENS BUT I WILL LOOK AGAIN.
9
QUESTION 8 PART 1
FORGOT
0

Session N15

0	0	13027	14372	600	0
0	0	7438	8497	878	0
0	1	7775	9174	6000	0
0	1	8279	9488	0	0
3	5	5296	11	14000	0
25	13	2954	5	0	0

TACTICS

1	2	0	4	0
2500	2900	0	0	0
6	4	0	0	0
1	1	0	3	0
0	2	3	4	0
0	2000	0	0	0
0	6	0	0	0
0	5	0	6	0

COMMANDS
1IMMIMIMD743
75 2 3

CRACKS

1 1 0 , 1 0 12

Session N16

0	1	12008	12789	600	0
1	1	6306	7116	878	0
0	1	6635	7425	6000	0
0	1	7215	8106	0	0
4	5	6116	13	14500	0
25	13	2554	5	0	0

TACTICS

1	2	3	4	0
2500	2900	0	0	0
6	4	0	0	0
1	2	1	3	0
0	2	3	4	0
0	2000	0	0	0
0	6	0	0	0
0	5	0	6	0

COMMANDS
33SIIGMMMM3G
94

CRACKS

1 0 12

Session N15

QUESTION 1 PART 1
7000
4
QUESTION 1 PART 2
FORGET
0
QUESTION 2 PART 1
1
9
QUESTION 3 PART 1
N
9
QUESTION 3 PART 2
Y
9
QUESTION 3 PART 3
N
9
QUESTION 4 PART 1
B D A
9
QUESTION 5 PART 1
YES TO JOIN SHIPS FOR REPAIRS
9
QUESTION 5 PART 2
N
9
QUESTION 5 PART 3
REPAIRED ,NFOED,KIL
9
QUESTION 6 PART 1
NA
0
QUESTION 7 PART 1
FININCH SEWING UP HOLES
9
QUESTION 8 PART 1
ONLY PATTERNS AS YET
9

Session N16

QUESTION 1 PART 1
3
9
QUESTION 2 PART 1
N
9
QUESTION 2 PART 2
Y
9
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 2
YES
9
QUESTION 4 PART 1
YES TO REFUEL AND CHASE KLINGS
9
QUESTION 4 PART 2
NO
9
QUESTION 4 PART 3
REFUEL GOT TACTICREPAIR
9
QUESTION 5 PART 1
DEECREASE
6
QUESTION 6 PART 1
11000
6
QUESTION 7 PART 1
RETURN TO BASE CONTROL FOR MY OVERDUE LEAV
10
QUESTION 8 PART 1
ONLY PULSATING PATTERNS
9

RECORD 5

SESSION N1.

1	1	19220	0	5650	0
1	1	20211	0	5950	0
0	1	18567	0	0	0
0	0	18875	0	0	0
3	0	3617	0	1500	0
5	5	7137	0	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	1	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	1	0	0	0

COMMANDS
24G771DDGMMD

CRACKS

0 0 0 0 0 0 0

Session N2.

1	0	19742	0	6150	0
1	1	19319	0	7950	0
0	1	18593	0	0	0
0	1	17540	0	0	0
3	0	4677	0	3500	0
9	7	6130	2	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	2	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	2	0	0	0

COMMANDS
IMD141471GMM
2

CRAC S

0 0 1 0 1 0 2

Session N1

QUESTION 1 PART 1
5
9
QUESTION 2 PART 1
3
0
QUESTION 3 PART 1
6
9
QUESTION 4 PART 1
£000 AT A GUESS
9
QUESTION 5 PART 1
5817
8
QUESTION 5 PART 2
7137
9
QUESTION 6 PART 1
YES
8
QUESTION 6 PART 2
NO
8
QUESTION 6 PART 3
NO
5
QUESTION 6 PART 4
NO
4
QUESTION 6 PART 5
YES
6
QUESTION 7 PART 1
2
5
QUESTION 8 PART 1
1
6

Sesrion N2

QUESTION 1 PART 1
10
7
QUESTION 2 PART 1
3-4000 AT A GUESS
7
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
N0
7
QUESTION 4 PART 2
YES
7
QUESTION 5 PART 1
A
10
QUESTION 5 PART 2
NO
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
YES-TO FACILITATE RAPID RETURN TO BASE FOR REFUEL
10
QUESTION 7 PART 2
YES- TO INCREASE ENERGY RESERVES
10
QUESTION 7 PART 3
DOCKED,REFUELLED,BLASTED KLINGONS AND MADE CRACKS
7
QUESTION 8 PART 1
NA
10

Session N3

1	1	19484.	19141	8150	0
1	1	21914	22400	8250	0
0	1	16204	16960	0	0
0	1	16228	16943	0	0
4	0	3477	0	5000	0
11	6	5057	3	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	2	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	2	0	0	0

COMMANDS
3111146111111
92

CRACKS

0 0 1 1 1 0 3

Session N4

0	1	18207	19141	8150	0
0	1	20809	22400	8250	0
1	1	15072	16960	957	0
1	1	16876	16943	0	0
4	1	3477	0	9000	0
12	9	0	0	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	2	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	2	0	0	0

COMMANDS
11111146111
2

CRACKS

0 0 1 1 1 0 3

Session N3

QUESTION 1 PART 1
10
9
QUESTION 2 PART 1
3
3
QUESTION 3 PART 1
4
10
QUESTION 4 PART 1
NA
10
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 3
NA
10
QUESTION 5 PART 1
NA
10
QUESTION 6 PART 1
NOT DURING LAST SESSION
10
QUESTION 6 PART 2
YES- TO ENLARGE ENERGY STOCKS
10
QUESTION 6 PART 3
MOVED,REFUELLED,INVESTED ENERGY,DESTROYED KLINGONS,MADE CRACK
9
QUESTION 7 PART 1
HOPEFULLY IT WILL INCREASE
6
QUESTION 8 PART 1
3000
2

Session N4

QUESTION 1 PART 1
14
8
QUESTION 2 PART 1
THOUSANDS-MAYBE 8-9000
9
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
YEES
10
QUESTION 4 PART 1
-I THINK SO
9
QUESTION 4 PART 2
NO
9
QUESTION 4 PART 3
NO
9
QUESTION 4 PART 4
NO
9
QUESTION 4 PART 5
YES
9
QUESTION 5 PART 1
NO
8
QUESTION 5 PART 2
YES
8
QUESTION 6 PART 1
NA
10
QUESTION 6 PART 2
NA
10
QUESTION 6 PART 3
NA
10
QUESTION 7 PART 1
NO IDEA
10
QUESTION 8 PART 1
NOT IN LAST SESSION
10
QUESTION 8 PART 2
YES-ATTEMPT TO STORE ENERGY PESERVES
10
QUESTION 8 PART 3
BLASTED KLINGONS,RAN OUT OF ENERGY
10

Session N5

0	1	16876	19141	8150	0
0	0	19781	22400	8250	0
1	1	22538	16960	957	0
0	1	15468	16943	0	0
4	2	2427	0	9500	0
13	9	3021	4	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	2	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	2	0	0	0

COMMANDS
111111111 4M1

CRACKS

1 0 1 1 1 0 5

Session N6

1	1	15857	16305	8150	0
1	1	20968	21096	13250	0
1	1	20981	21492	1128	0
0	1	14020	14280	0	0
4	2	6453	0	9500	0
13	9	9851	4	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	3	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	3	0	0	0

COMMANDS
1171111GM666
985

CRACKS

1 1 1 1 1 0 5

Session N6

QUESTION 1 PART 1
14
8
QUESTION 2 PART 1
12000
7
QUESTION 3 PART 1
6453-AS LAST NOTED
10
QUESTION 3 PART 2
11051-AS LAST LOGGED
10
QUESTION 4 PART 1
4
10
QUESTION 5 PART 1
YES-TO GET BACK TO A BASE AND REFUELL
10
QUESTION 5 PART 2
YES-IN HOPE OF STORING EENERGY
9
QUESTION 5 PART 3
DOCKEED,REFUELLED BOTH SHIPS,ENQUIRED ABOUT BASE
10
QUESTION 6 PART 1
JUST 6%
7
QUESTION 7 PART 1
0% TO 20%
7
QUESTION 8 PART 1
16305 WHEN LAST LOGGED.
10

Session N5

QUESTION 1 PART 1
16
8
QUESTION 2 PART 1
N0
10
QUESTION 2 PART 2
YES
10
QUESTION 3 PART 1
YES
10
QUESTION 4 PART 1
NO
6
QUESTION 4 PART 2
YEES
8
QUESTION 4 PART 3
NO
8
QUESTION 5 PART 1
I SUSPECT THAT THEY ARE ALL INTERDEPENDANT
6
QUESTION 6 PART 1
NOT IN THE LAST SESSION
10
QUESTION 6 PART 2
NOT IN THE LAST SESSION
10
QUESTION 6 PART 3
MOVED SHIP Y,SOUGHT KLINGONS,TRIED TO POSITION FOR DOCKING
10
QUESTION 7 PART 1
DECREASE - IF INFO ON DEPRECIATION OF ENERGY LEVELS IS ANYTHING TO GO BY
10
QUESTION 8 PART 1
NO

Session N7

0	0	14781	16305	8150	0
0	1	19525	21096	13250	0
0	1	19655	21492	1128	0
0	1	12626	14280	0	0
4	2	3953	0	11000	0
16	12	4351	4	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	3	0	0	0
0	2	0	0	0
0	1000	0	0	0
0	4	0	0	0
0	3	0	0	0

COMMANDS
11614111I4MM
2 3

CRACKS

1 0 1 1 1 0 5

Session N8

1	1	13641	16305	8150	0
0	1	18303	21096	13250	0
0	1	8152	21492	1128	0
0	1	11541	14290	0	0
4	2	3917	0	12000	0
17	12	4207	5	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	4	0	0	0
1	2	0	0	0
1000	1000	0	0	0
8	4	0	0	0
0	4	0	0	0

COMMANDS
MM614MMG17M7
2

CRACKS

1 1 1 1 1 0 9

Session N7
QUESTION 1 PART 1
16 ACCORDING TO LOG
10
QUESTION 2 PART 1
4000 APPROX-EXACT AMOUNT NOT LOGGED
8
QUESTION 2 PART 2
4351-LOGGED
10
QUESTION 3 PART 1
NO IDEA
10
QUESTION 4 PART 1
YES
7
QUESTION 4 PART 2
NO
7
QUESTION 4 PART 3
NO
7
QUESTION 4 PART 4
NO
7
QUESTION 4 PART 5
YES
9
QUESTION 5 PART 1
AS I SAID BEFORE I SUSPECT THEY ARE ALL INTER DEPENDANT
7
QUESTION 6 PART 1
NOT DURING LAST SESSION
8
QUESTION 6 PART 2
NOT DURING LAST SESSION
10
QUESTION 6 PART 3
MOVED SHIP X AND Y,BLASTED KLINGONS,MADE HOLE
10
QUESTION 7 PART 1
JUST 6%
6
QUESTION 8 PART 1
21096 WHEN LAST LOGGED BUT COULD HAVE ALTERED BY NOW
10

Session N8
QUESTION 1 PART 1
YES
10
QUESTION 1 PART 2
YES
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
YES
7
QUESTION 4 PART 1
YES
10
QUESTION 4 PART 2
NO
10
QUESTION 5 PART 1
YES-TO ENABLE ME TO SPACE-HOP
10
QUESTION 5 PART 2
YES-GENERALLY AS BEFORE TO KEEP UP ENERGY STOCKS
10
QUESTION 5 PART 3
DESTROYED KLINGONS,MADE CRACK IN PROCESS,
10
QUESTION 6 PART 1
I HAVE NO HAVE NO WAY OF KNOWING FOR SURE.
6
QUESTION 7 PART 1
THIS COULD DEPEND ON THE TRADE THAT IS ABLE TO
10
QUESTION 8 PART 1 GET THROUGH -NA
0% TO 20%
7

Session N9

0	1	12357	16305	8150	0
0	1	17203	21096	13250	0
0	1	17128	21492	1128	0
1	1	15530	14280	0	0
4	2	1147	0	16500	0
17	12	2932	5	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	4	0	0	0
1	2	3	0	0
1000	1000	0	0	0
8	4	0	0	0
2	4	0	0	0

COMMANDS
7111171MM6M7
5

CRACKS

1 1 1 1 1 0 9

Session N10

0	1	11373	16305	8150	0
1	1	15975	21096	13250	0
1	1	15860	21492	1128	0
0	0	14250	14280	0	0
4	9	2853	0	18000	0
17	12	2132	5	0	0

TACTICS

0	2	0	0	0
0	1000	0	0	0
0	2	0	0	0
0	4	0	0	0
1	2	3	4	0
1000	1000	0	0	0
8	4	0	0	0
2	4	0	0	0

COMMANDS
MM6MM6MMMMMM
2 2

CRACKS

1 1 1 1 1 0 9

Session N9

QUESTION 1 PART 1
4
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
YES
9
QUESTION 3 PART 2
NO
10
QUESTION 3 PART 3
NO
10
QUESTION 3 PART 4
NO
10
QUESTION 3 PART 5
YES
9

QUESTION 4 PART 1
NO-I THINK THEY ALL COOPERATE
8
QUESTION 4 PART 2
YES
8
QUESTION 4 PART 3
NO
8
QUESTION 5 PART 1
YES-AS BFFORE
9
QUESTION 5 PART 2
YES-AS BEFORE
10
QUESTION 5 PART 3
MOVED SHIPS,REFUELLED,GOT BLOCKED BYCRACKS.
10
QUESTION 6 PART 1
NO WAY OF KNOWING THE ANSER TO THIS ONE
10
QUESTION 7 PART 1
0 I WOULD PRESUME
7
QUESTION 8 PART 1
I WILL TRY TO GET SHIP X REFUELLED
10

Session N10

QUESTION 1 PART 1
25-APPROX
8
QUESTION 2 PART 1
YES
10
QUESTION 2 PART 2
YES
10
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
YES
8
QUESTION 4 PART 1
YES-FOR SAME REASONS I GAVE BEFORE
10
QUESTION 4 PART 2
NOT RECENTLY
10
QUESTION 4 PART 3
REFUELLED SHIP X
10
QUESTION 5 PART 1
I HAVE NO IDEA
10
QUESTION 6 PART 1
I HAVE NO WAY OF DECIDING WHAT DETERMINES INCREASE 'DECREASE
10
QUESTION 7 PART 1
ENQUIRE FROM INFORMATION ON THEE STATE OF BASE ENEGIIES AND
10
QUESTION 8 PART 1
I HAVEN'T HAD A LOOKED YET BUT I WILL ON NEXT SESSION
10

Session N11

1	1	8705	10996	13937	0
1	1	13297	15605	17250	0
0	0	13301	15618	1128	0
1	1	13678	14074	9973	0
4	9	4241	0	18500	0
18	12	3553	5	0	0

TACTICS

1	2	0	0	0
1000	1000	0	0	0
8	2	0	0	0
2	6	0	0	0

1	2	3	0	0
1000	1000	0	0	0
8	4	9	0	0
2	5	0	0	0

COMMANDS
GMM1671GMMMM
7

CRACKS

1 1 1 1 1 0 9

Session N11
QUESTION 1 PART 1
4
10
QUESTION 2 PART 1
YES
10
QUESTION 3 PART 1
YES
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
YES-FOR SAME REASONS GIVEN BEEFORE
10
QUESTION 4 PART 2
AS ABOVE
10
QUESTION 4 PART 3
REFUELLED AND INVESTED
10
QUESTION 5 PART 1
THIS IS MY LAST SESSION THIS TRIP
10
QUESTION 6 PART 1
I STILL DONT KNOW WHAT THEY ARE
10
QUESTION 7 PART 1
1
7
QUESTION 8 PART 1
10996 AS LAST LOGGED BUT COULD NOW BE MORE OR LESS
10

RECORD 6

SESSION N1.

0	1	18247	0	0
0	0	18663	0	0
0	1	18069	0	0
0	0	17926	0	0
3	0	5337	0	1000
6	0	10000	0	0

COMMANDS
DDDSIMDDDI
3 3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	6
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	1	18247	19817	0
0	1	18663	19617	0
0	1	18069	19602	0
0	1	17926	19671	0
2	0	7600	0	1000
0	0	5550	0	0

COMMANDS
761517111GG
93

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	0	0	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0

CABIN 2 SENDING.SESSION 1
I AM IN SECTORS A , D BUT MOVING TO A, B- CAN U TAKE SECTS CD
YES

SESSION N1.

QUESTION 1 PART 1
6
9
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
6
9
QUESTION 2 PART 1
2
10
QUESTION 3 PART 1
6
9
QUESTION 3 PART 1
3
10
QUESTION 4 PART 1
4500
9
QUESTION 4 PART 1
1700
6
QUESTION 5 PART 1
5945
7
QUESTION 5 PART 2
10000
9
QUESTION 5 PART 1
8000
6
QUESTION 5 PART 2
6400
9

QUESTION 6 PART 1
YES
6
QUESTION 6 PART 2
NA
NA
QUESTION 6 PART 3
6
6
QUESTION 6 PART 4
NA
9
QUESTION 6 PART 5
NA
9
QUESTION 6 PART 1
YES
9
QUESTION 6 PART 2
NO
7
QUESTION 6 PART 3
NO
4
QUESTION 6 PART 4
NO
5
QUESTION 6 PART 5
YES
7
QUESTION 7 PART 1
2
5
QUESTION 7 PART 1
2
7
QUESTION 8 PART 1
2
5
QUESTION 8 PART 1
3
5

SESSION N2.

0	0	18142	0	0
0	1	21482	0	0
0	1	15682	0	0
0	0	15769	0	0
3	2	100	0	2500
9	0	8950	0	0

COMMANDS
MDIMDDIMII
2 3 2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	2	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

1	0	18142	19817	500
1	1	21482	19617	1550
0	0	15682	19602	0
0	1	15769	19671	0
2	0	11100	0	1000
0	0	6826	0	0

COMMANDS
777GM11161
2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	1	2	0	0	0

SESSION N2.

QUESTION 1 PART 1
9
9
QUESTION 1 PART 1
3
10
QUESTION 2 PART 1
NONE
7
QUESTION 2 PART 1
3000
4
QUESTION 3 PART 1
NA
9
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
NO
9
QUESTION 4 PART 2
YES
9
QUESTION 4 PART 1
NO
6
QUESTION 4 PART 2
YES
9
QUESTION 5 PART 1
NO
9
QUESTION 5 PART 2
NO
9
QUESTION 5 PART 1
N0
10
QUESTION 5 PART 2
YYEEEES
10
QUESTION 6 PART 1
NA
9
QUESTION 6 PART 1
ACD-ONLY A GUESS
5
QUESTION 7 PART 1
NO
9
QUESTION 7 PART 2
NO
9
QUESTION 7 PART 3
BEEN CONFUSED
9
QUESTION 7 PART 1
YES,TO DOCK AND REFUEL,TO DESTROY.
10
QUESTION 7 PART 2
YES,TO INCREASE ENERGY STOCKS
10
QUESTION 7 PART 3
TACTIC-DOCKAND REFUEL,SOUGHT KLONGS.
10
QUESTION 8 PART 1
NA
9
QUESTION 8 PART 1
20000
6

SESSION N3.

0	0	1587ø	0	0
0	1	19781	0	0
0	0	13538	0	0
0	0	13468	0	0
4	12	200	0	4000
12	0	6698	0	0

COMMANDS
GD1MM4246D
2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	1	15876	19817	500
0	1	19781	19617	1550
0	0	13538	19602	0
0	1	13468	19671	0
2	0	9900	0	2000
1	0	2776	0	0

COMMANDS
I114115C11
2 3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	1	2	0	0	0

CABIN 2 SENDING.SESSION 3
HEAVY CONCENTRATION OF KLINGONSIN SECTOR D-GO GET EM
SHIP X HAS LOW ENERGY PROBLEM HENCE UNABLE TO
CABIN 2 SENDING.SESSION 3
TRY TO DOCK YOUR SHIP AND REFUELL USING TACTIC >
??

SESSION N3.

QUESTION 1 PART 1
5
9
QUESTION 1 PART 1
4
10
QUESTION 2 PART 1
NA
9
QUESTION 2 PART 1
2-GUESS
5
QUESTION 3 PART 1
4
9
QUESTION 3 PART 1
2
10
QUESTION 4 PART 1
NA
9
QUESTION 4 PART 2
NA
9
QUESTION 4 PART 3
YES
9
QUESTION 4 PART 1
NA
10
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 3
NA
10

QUESTION 5 PART 1
NA
9
QUESTION 5 PART 1
BCD MAYBE.IM GUESSING
7
QUESTION 6 PART 1
NO
9
QUESTION 6 PART 2
NO
9
QUESTION 6 PART 3
DESTROYED KLINGONS
9
QUESTION 6 PART 1
YES-BEST WAY REFUEL AND DESTROY.
10
QUESTION 6 PART 2
YES-TOENRICH ENERGY STOCKS
10
QUESTION 6 PART 3
COMM.CHECK ON KLINGS MOVED.
10
QUESTION 7 PART 1
STAY CONSTANT
5
QUESTION 7 PART 1
INCREASE
3
QUESTION 8 PART 1
5000
6
QUESTION 8 PART 1
15000-THIS IS A GUESS
4

SESSION N4.

0	0	14125	0	0
0	1	20241	0	0
0	1	18944	0	0
1	0	16273	0	0
4	15	3067	0	5500
16	0	3423	0	0

COMMANDS
MK1M4M1446D
3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	1	14125	19817	500
1	1	20241	19617	1550
0	1	18944	19602	0
0	0	16273	19671	0
2	0	9900	0	3000
2	0	2422	0	0

COMMANDS
411111717

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	1	4	0	0	0

SESSION N4.

QUESTION 1 PART 1
3
9
QUESTION 1 PART 1
7
9
QUESTION 2 PART 1
0
9
QUESTION 2 PART 1
6000-GUESS
4
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 2
NO
9
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
NA
7
QUESTION 4 PART 2
NA9
VNO
QUESTION 4 PART 3
NO
5
QUESTION 4 PART 4
YES
5
QUESTION 4 PART 5
NO
9
QUESTION 4 PART 1
YES
6
QUESTION 4 PART 2
NO
10
QUESTION 4 PART 3
NO
8
QUFSTION 4 PART 4
NO
7
QUESTION 4 PART 5
YES
9

QUESTION 5 PART 1
NO
9
QUESTION 5 PART 2
YES
9
QUESTION 5 PART 1
NO
8
QUESTION 5 PART 2
YES
9
QUESTION 6 PART 1
NO
9
QUESTION 6 PART 2
YES
7
QUESTION 6 PART 3
NO
5
QUESTION 6 PART 1
NO
3
QUESTION 6 PART 2
YES
9
QUESTION 6 PART 3
NO
7
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 1
BCD-I GUESS ONLY
4
QUESTION 8 PART 1
NO
9
QUESTION 8 PART 2
NO
9
QUESTION 8 PART 3
K:OD KLINGONS
9
QUESTION 8 PART 1
YES-EASY WAY MOVE,DOCK DESTROY.
10
QUESTION 8 PART 2
YES-TO GET RICHER
10
QUESTION 8 PART 3
Y-DOCKED,KILLED KS,SOUGHT MORE.
10

SESSION N5.

0	0	12256	0	0
0	1	22804	0	0
0	1	8713	0	0
1	1	16283	0	117
4	15	3581	0	6000
16	0	3423	0	0

COMMANDS
MGDG72SMMG

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	1	0	0	0	0
0	0	0	0	0	0

0	1	12256	19817	500
1	1	22804	19617	1550
0	1	8713	19602	0
0	1	16283	19671	0
2	3	9500	0	3500
3	0	5183	0	0

COMMANDS
1411111111
2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	1	4	0	0	0

SESSION N5.

QUESTION 1 PART 1
4
9
QUESTION 1 PART 1
7
10
QUESTION 2 PART 1
NO
9
QUESTION 2 PART 2
NO9 NO
9
QUESTION 2 PART 1
NO
10
QUESTION 2 PART 2
NO
10
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 1
NO
10
QUESTION 4 PART 1
MNA
9
QUESTION 4 PART 2
NO
9
QUESTION 4 PART 3
NA
9
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
YES
10
QUESTION 4 PART 3
NO
10
QUESTION 5 PART 1
NA
9
QUESTION 5 PART 1
BCD AT A GUESS
4

QUESTION 6 PART 1
YES
9
QUESTION 6 PART 2
YES TO INCREASE ECONOMY OF STARBASE
9
QUESTION 6 PART 3
RETURNED TO STARBASE AND REFUELED
9
QUESTION 6 PART 1
YES-AS BEFORE
10
QUESTION 6 PART 2
YES-AS BEFORE
0
QUESTION 6 PART 3
Y-LOW,REFUELLED,SOUGHT KLINGS.
10
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 1
INCREASE-I HOPE
10
QUESTION 8 PART 1
NA
9
QUESTION 8 PART 1
NA
10

SESSION N6.

0	1	10373	0	0
0	1	20975	0	0
1	1	9880	0	61
1	0	15250	0	117
4	15	616	0	7000
16	0	3023	0	0

COMMANDS
MMGMM6GMIM
2 3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	1	2	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	0	10373	19817	500
0	0	20975	19617	1550
0	1	9880	19602	0
0	1	15250	19671	0
2	3	5800	0	3500
3	0	4983	0	0

COMMANDS
MMIICCIMCM
32

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	1	4	0	0	0

CABIN 2 SENDING.SESSION 6
JUST DID KLING SCAN-THEY HAVE MOVED FROM D.REAPPEARED A'
OK WILL INTERCEPT WITH X FROM D
CABIN 2 SENDING.SESSION 6
CAN U STAY IN C D-AND USE TACTICS( )TO DEESEETEEREEOEYE
PLEASE EXPLAIN DEESEETEEREEOEYE
CABIN 2 SENDING.SESSION 6
URGENT-NO JOKE-SUSPECIOUSINGS MOVE
USE TACTIC 3.
JM

SESSION N6

QUESTION 1 PART 1
NA
9
QUESTION 1 PART 1
8
10
QUESTION 2 PART 1
1500
7
QUESTION 2 PART 1
8000
3
QUESTION 3 PART 1
1900
7
QUESTION 3 PART 2
3140
9
QUESTION 3 PART 1
6600 WHEN LAST NOTED
10
QUESTION 3 PART 2
4983-AS LAST NOTED
10
QUESTION 4 PART 1
2
9
QUESTION 4 PART 1
2
10
QUESTION 5 PART 1
YES
9
QUESTION 5 PART 2
YES COS OF XS ENERGY
9
QUESTION 5 PART 3
MOVED X TOC
9
QUESTION 5 PART 1
YES,AS BEFORE
10
QUESTION 5 PART 2
YES,AS BEFORE
10
QUESTION 5 PART 3
COMM,POSITIONED SHIPS.
10
QUESTION 6 PART 1
NA
9
QUESTION 6 PART 1
2
5
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 1
3
5
QUESTION 8 PART 1
NA
9
QUESTION 8 PART 1
13538-ASLAST NOTED
10

SESSION N7.

0	1	10221	0	0
0	1	18635	0	0
1	1	9695	0	147
1	1	17209	0	117
4	15	2778	0	7500
16	0	473	0	0

COMMANDS
1516GM6C11
3 2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	2	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

1	1	10221	19817	1433
0	1	18635	19617	1550
0	0	9695	19602	0
0	1	17209	19671	0
2	3	5400	0	4500
3	0	3799	0	0

COMMANDS
7117117116
3 2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	2	6	0	0	0

CABIN 1 SENDING-SESSION 7
SUGGEST YOU MOVE TO SECTOR C IN FORCE MANY KS
FIRST I KILL LAST 2 IN A,THEN WILL AID WITH BOTH SHIPS

SESSION N7.

QUESTION 1 PART 1
2
9
QUESTION 1 PART 1
8
10
QUESTION 2 PART 1
3000
9
QUESTION 2 PART 2
600
9
QUESTION 2 PART 1
5400-ASLAST NOTED
10
QUESTION 2 PART 2
4999-ASLAST NOTED
10
QUESTION 3 PART 1
NA
9
QUESTION 3 PART 1
3-AT A GUESS
7
QUESTION 4 PART 1
NO
9
QUESTION 4 PART 2
YES
9
QUESTION 4 PART 3
YES
9
QUESTION 4 PART 4
NO
9
QUESTION 4 PART 5
NA
9
QUESTION 4 PART 1
YES
10
QUESTION 4 PART 2
NO
10
QUESTION 4 PART 3
NO
10
QUESTION 4 PART 4
NO
10
QUESTION 4 PART 5
YES
10

QUESTION 5 PART 1
NA
9
QUESTION 5 PART 1
BCD-GUESSING
8
QUESTION 6 PART 1
YESTO ELIMINATE MAX NO OF KS
9
QUESTION 6 PART 2
YES,TO BOOST ECONOMY BASES.
9
QUESTION 6 PART 3
ATTEMPTED TO DOCK Y
9
QUESTION 6 PART 1
YES,AS BEFORE
10
QUESTION 6 PART 2
YES,AS BEFORE
10
QUESTION 6 PART 3
COMM,REFUEL,MOVED,DESTROY.
10
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 1
2
10
QUESTION 8 PART 1
VERY
6
QUESTION 8 PART 1
GUESS,19000.
8

```
SESSION NB.
 0          1          18033      0          0
 0          1          18615      0          0
 1          1          9581       0          147
 1          1          17026      0          117
 4          15         2778       0          7500
 16         0          473        0          0

COMMANDS


CRACKS
 0   0   0   0   0   0   0

TACTICS
 0          2          3          0          0          0
 0          1000       0          0          0          2
 0          6          0          0          0          0
 0          2          3          0          0          0

 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0

 1          1          18033      19817      1433
 0          1          18615      19617      1550
 0          0          9581       19602      0
 0          1          17026      19671      0
 2          3          5400       0          4500
 3          0          3799       0          0

COMMANDS
            2

CRACKS
 0   0   0   0   0   0   0

TACTICS
 0          2          3          0          0          0
 0          1000       0          0          0          0
 0          4          0          0          0          0
 0          1          0          0          0          0

 0          2          3          0          0          0
 0          1000       0          0          0          0
 0          2          0          0          0          0
 0          2          6          0          0          0
```



```
SESSION NB.

QUESTION  1   PART  1
N
6
QUESTION  1   PART  2
N
8
QUESTION  1   PART  1
NB
10
QUESTION  1   PART  2
NB
10
QUESTION  2   PART  1
N
3
QUESTION  2   PART  1
NO
10
QUESTION  3   PART  1
NA
3
QUESTION  3   PART  2
EDDY NEXT DOOR
6
QUESTION  3   PART  1
NO
7
QUESTION  3   PART  2
YES
7
QUESTION  4   PART  1
N
8
QUESTION  4   PART  2
YES
9
QUESTION  4   PART  1
NO
10
QUESTION  4   PART  2
YES
10

QUESTION  5   PART  1
YES,TO BOOST BASE ECONOMY.
8
QUESTION  5   PART  2
YES TO GRT ENERGY
6
QUESTION  5   PART  3
DOCKED
9
QUESTION  5   PART  1
ES,ASBEFORE
10
QUESTION  5   PART  2
YES,AS BEFORE
10
QUESTION  5   PART  3
COMM,REFUEL,MOVED,GOT INFO.
10
QUESTION  6   PART  1
DECRFASE
8
QUESTION  6   PART  1
INCREASE
4
QUESTION  7   PART  1
NA
6
QUESTION  7   PART  1
NA
10
QUESTION  8   PART  1
50-50
7
QUESTION  8   PART  1
3
5
```

SESSION N9.

0	1	7953	9677	0
0	1	17051	18239	0
1	1	18609	18129	375
1	1	16949	18655	567
4	16	1225	0	8500
16	0	3184	0	0

COMMANDS
IMIIMGMG11
9J

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	2	5	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	1	7953	19817	1433
0	1	17051	19617	1550
0	0	18609	19602	0
0	1	16949	19671	0
2	3	3800	0	5500
3	0	1549	0	0

COMMANDS
1711!7IC11
2 3 2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	2	5	0	0	0

CABIN 2 SENDING.SESSION 9
SECTORS AR CLEAR-MOVING TO SECTOR D NOW
OK WILL CONCEMTRATE ON C.

SESSION N9.

QUESTION 1 PART 1
3
8
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
N
9
QUESTION 2 PART 1
NO
10
QUESTION 3 PART 1
YES
8
QUESTION 3 PART 2
NO
8
QUESTION 3 PART 3
NO
7
QUESTION 3 PART 4
NO
8
QUESTION 3 PART 5
,NO
2
QUESTION 3 PART 1
YES
9
QUESTION 3 PART 2
NO
10
QUESTION 3 PART 3
NO
10
QUESTION 3 PART 4
NO
10
QUESTION 3 PART 5
YES
10
QUESTION 4 PART 1
N
5
QUESTION 4 PART 2
YES
4
QUESTION 4 PART 3
NO
6
QUESTION 4 PART 1
NO
7
QUESTION 4 PART 2
YES
9
QUESTION 4 PART 3
NO
7

QUESTION 5 PART 1
YES TO DOCK AND REFUEL
9
QUESTION 5 PART 2
YES TO BOOST ECONOMY
9
QUESTION 5 PART 3
MOVED TO C AND DESTROYED WITH TACTIC
9
QUESTION 5 PART 1
YES,AS BEFORE
10
QUESTION 5 PART 2
YES,AS BEFORE
10
QUESTION 5 PART 3
MOVED,DESTROYED KS,GOT INFO
10
QUESTION 6 PART 1
NA
7
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
5000
6
QUESTION 7 PART 1
16000
6
QUESTION 8 PART 1
BOTH SHIPS AT C,KILL TO SAVE TRADE.
10
QUESTION 8 PART 1
REFUELL SHIP Y,KILL KS IN SECTOR D
10

SESSION N10.

0	1	5941	9677	0
0	1	15346	18239	0
1	1	15576	18129	1375
0	1	17157	18655	567
4	18	4243	0	9500
16	0	500	3	0

COMMANDS
MIMM177717

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	2	5	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	2	0	0	0

0	1	5941	19817	1433
0	1	15346	19617	1550
0	1	15576	19602	0
1	1	17157	19671	0
2	6	3400	0	7500
3	0	2269	0	0

COMMANDS
111117;7I1
3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	1	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	2	10	2	0	0

SESSION N10.

QUESTION 1 PART 1
9
4
QUESTION 1 PART 1
15
10
QUESTION 2 PART 1
N
9
QUESTION 2 PART 2
N
6
QUESTION 2 PART 1
NO
10
QUESTION 2 PART 2
N0
10
QUESTION 3 PART 1
N
7
QUESTION 3 PART 2
LIKELY
8
QUESTION 3 PART 1
NO
6
QUESTION 3 PART 2
YES
7
QUESTION 4 PART 1
YES TO DOCK AND GET SOME ENERGY
9
QUESTION 4 PART 2
YES TO BOOST UP BASE ECONOMY
8
QUESTION 4 PART 3
GOT TO C,START KILL KS THERE.
9
QUESTION 4 PART 1
YES,AS BEFORE
10
QUESTION 4 PART 2
YES,AS BEFORE
10
QUESTION 4 PART 3
REFUEL Y,KILL KS AT D.
10
QUESTION 5 PART 1
DECREASE
8
QUESTION 5 PART 1
INCREASE I HOPE
10
QUESTION 6 PART 1
5999
7
QUESTION 6 PART 1
I DREAD TO THINK-2000 MAYBE
10
QUESTION 7 PART 1
CARRY ON AT C.
9
QUESTION 7 PART 1
KILL AT D,DOCK A,KILL AT C.
10
QUESTION 8 PART 1
NA
9
QUESTION 8 PART 1
NA
10

SESSION N11.

0	1	5851	5188	0
0	1	15165	14728	0
1	1	16545	17958	1875
0	1	15224	15693	567
4	26	3443	0	9500
16	0	3471	0	0

COMMANDS
111111166
2 2 93

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	2	5	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	2	0	0	0

1	1	5851	19817	1433
1	1	15165	19617	1550
0	0	16545	19602	0
0	0	15224	19671	0
2	6	4208	0	8000
3	0	3411	0	0

COMMANDS
7716MMIGMM
3 2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	2	0	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	3	11	0	0	0

SESSION N11.

QUESTION 1 PART 1
0
9
QUESTION 1 PART 1
15
9
QUESTION 2 PART 1
0
9
QUESTION 2 PART 1
15
9
QUESTION 3 PART 1
3000
6
QUESTION 3 PART 2
30006
6
QUESTION 3 PART 1
5508
9
QUESTION 3 PART 2
3411
9
QUESTION 4 PART 1
NO
7
QUESTION 4 PART 2
YES
8
QUESTION 4 PART 3
NO
6
QUESTION 4 PART 1
NO
9
QUESTION 4 PART 2
YES
10
QUESTION 4 PART 3
NO
9
QUESTION 5 PART 1
NO
9
QUESTION 5 PART 2
YES TO GET ECONOMY UP
8
QUESTION 5 PART 3
MOVED SHIP Y TO DOCK
9
QUESTION 5 PART 1
YES,AS BEFORE
10
QUESTION 5 PART 2
YES,AS BEFORE
10
QUESTION 5 PART 3
KILL AT D,DOCK A,BACK TO D.
10
QUESTION 6 PART 1
NA
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
FINISSH OFF KLINGONS AT C
9
QUESTION 7 PART 1
KILL K IN D,THEN KILL KS IN C
10
QUESTION 8 PART 1
NA
9
QUESTION 8 PART 1
NA
10

SESSION N12.

0	1	3860	6188	0
0	1	13446	14726	0
0	1	14628	17056	1875
0	1	13845	15697	567
4	27	500	0	11500
16	0	1421	0	0

COMMANDS
1717MMGIMG
3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	6	0	0	0	0
0	2	7	0	0	0

0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	4	0	0	0

0	1	3860	19817	1433
1	1	13445	19617	1550
0	0	14628	19602	0
0	0	13845	19671	0
2	6	2600	0	8000
3	0	1611	0	0

COMMANDS
GI511111CG
3 2 3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	4	0	0	0	0
0	3	1	0	0	0

0	2	3	0	0	0
0	1000	0	0	0	0
0	2	0	0	0	0
0	3	11	0	0	0

CABIN 2 SENDING.SESSION 12
AM AFTER K IN C ON CRACK C'A WILL U TAKE OTHER 2
YES HAVE KILLED ALL ATUNDER C AND RIGHT A IT
CABIN 2 SENDING.SESSION 12
CAN YOU DESTROY THE LAST KLINGON TOP LEFT C SECTOR
YES AM IN POSITION FINGER ON THE TRIGGER

SESSION N12.

QUESTION 1 PART 1
2
9
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
NO
9
QUESTION 2 PART 1
NO
10
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 2
YES
9
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
YES
10
QUESTION 4 PART 1
YES TO DESTROY EFFICIENTLY
9
QUESTION 4 PART 2
NO
5
QUESTION 4 PART 3
KILLED ALL THE REMAINING KS
9
QUESTION 4 PART 1
YES I DID USE TACTICS!I ALREADY SAID WHY
10
QUESTION 4 PART 2
YES,ALREADY SAID WHY.
10
QUESTION 4 PART 3
KILL AT D,COMM,DOCKED.
10
QUESTION 5 PART 1
GO HOME
100
QUESTION 5 PART 1
DOCK,REFUEL,GET BASE ENERGIES
10
QUESTION 6 PART 1
NA
100%
QUESTION 6 PART 1
AMOEBAS AND WEIRDIES.
10
QUESTION 7 PART 1
50%
8
QUESTION 7 PART 1
1
10
QUESTION 8 PART 1
15000
5
QUESTION 8 PART 1
NOT SURE-GUESS AT 8000
4

RECORD 7

SESSION N1.

0	1	19299	19898	0
0	1	19191	19745	0
0	1	18937	19742	0
0	1	18724	19814	0
5	0	7350	0	1000
0	0	7550	0	0

COMMANDS
12IMGG7M76
2 9
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0

0	0	19299	0	0
1	0	19191	0	0
0	0	18937	0	0
0	1	18724	0	0
2	0	8600	0	500
0	0	7000	0	0

COMMANDS
12SIGG6144
2 3
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

SESSION N1.

QUESTION 1 PART 1
2
10
QUESTION 1 PART 1
1
10
QUESTION 2 PART 1
2
10
QUESTION 2 PART 1
2
10
QUESTION 3 PART 1
2
110
QUESTION 3 PART 1
2
10
QUESTION 4 PART 1
NA
10
QUESTION 4 PART 1
600
10
QUESTION 5 PART 1
7550
8
QUESTION 5 PART 2
7980
F10
QUESTION 5 PART 1
8600
10
QUESTION 5 PART 2
7000
10

QUESTION 6 PART 1
NF
NL
QUESTION 6 PART 2
4EXMXN
10
QUESTION 6 PART 3
NA
10
QUESTION 6 PART 4
NA
10
QUESTION 6 PART 5
N
10
QUESTION 6 PART 1
NO
10
QUESTION 6 PART 2
NO
10
QUESTION 6 PART 3
YES
10
QUESTION 6 PART 4
YES
10
QUESTION 6 PART 5
NO
10
QUESTION 7 PART 1
2
10
QUESTION 7 PART 1
2
10
QUESTION 8 PART 1
N2
10
QUESTION 5 PART 1
100
0

SESSION N2.

0	1	28574	19898	0
0	1	27354	19745	0
0	0	23335	19742	0
0	0	18716	19814	0
5	0	3600	0	2000
2	2	6750	0	0

COMMANDS
26M6IMDRII
9 23 84
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0

0	0	28574	0	0
1	1	27354	0	8000
0	1	23335	0	0
0	1	18716	0	0
2	0	3427	0	500
0	0	5850	0	0

COMMANDS
2MM6M16MGS
2 7
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	1	0	0	0	0
0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	1	0	0	0	0

SESSION N2.

QUESTION 1 PART 1
2
10L
QUESTION 1 PART 1
0
10
QUESTION 2 PART 1
600
10
QUESTION 2 PART 1
0
10
QUESTION 3 PART 1
1
10
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
Y
10G
QUESTION 4 PART 1
N0
10
QUESTION 4 PART 2
N0
10

QUESTION 5 PART 1
Y
10
QUESTION 5 PART 2
N
10
QUESTION 5 PART 1
YES
10
QUESTION 5 PART 2
NO
10
QUESTION 6 PART 1
A OR B OR C
10
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
SPACE SHIP EARTH
10
QUESTION 7 PART 2
IT DOES NOT COMMUNICATE WITH
OTHER PLAANETS 10
QUESTION 7 PART 1
STARBASE A
10
QUESTION 7 PART 2
THEY OCCUPY DIFFERENT SPACES
10
QUESTION 8 PART 1
19898
10
QUESTION 8 PART 1
NA
10

SESSION N3.

1	1	46810	19898	1000
0	1	26700	19745	0
0	0	24052	19742	0
0	0	33730	19814	0
5	0	2000	0	2000
2	2	16015	0	0

COMMANDS
I1MSI1771M
2 45
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	1	0	0	0

1	0	46810	0	0
0	1	27600	0	8000
0	1	24052	0	0
0	0	33730	0	0
2	0	1227	0	1000
1	0	3700	0	0

COMMANDS
6MMDI1116GG
4 7 2
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0

CABIN 2 SENDING.SESSION 3
ARE YOU REALLY THERE
YES BUT DOCKING AT BASE A I

SESSION N3.

QUESTION 1 PART 1
0
10
QUESTION 1 PART 1
1
10
QUESTION 2 PART 1
NA
110
QUESTION 2 PART 1
NA
10
QUESTION 3 PART 1
1
7
QUESTION 3 PART 1
2
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 3
Y
10
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
YES
10
QUESTION 4 PART 3
NO
10
QUESTION 5 PART 1
A OR B OR C
0
QUESTION 5 PART 1
NA
10
QUESTION 6 PART 1
8
10
QUESTION 6 PART 2
DIFF ECONOMIES
10
QUESTION 6 PART 1
STARBASE A
10
QUESTION 6 PART 2
THEY OCCUPY DIRRERENT AREAS IN SPACE
10
QUESTION 7 PART 1
NA
10
QUESTION 7 PART 1
INCREASE
10
QUESTION 8 PART 1
28216
10
QUESTION 8 PART 1
NA
10

SESSION N4.

0	0	55396	19898	1000
0	1	31056	19745	0
0	1	36766	19742	0
0	0	50179	19814	0
5	4	500	0	2500
2	2	13765	0	0

COMMANDS
666GIMIGGM
213 4
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	2	0	0	0
0	0	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	2	0	0	0

0	0	55396	0	0
0	0	31056	0	8000
0	1	36766	0	0
0	0	50179	0	0
2	0	1027	0	2000
4	0	900	0	0

COMMANDS
614241442M
2
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0

SESSION N4.

QUESTION 1 PART 1
NA
10
QUESTION 1 PART 1
4
10
QUESTION 2 PART 1
0
10
QUESTION 2 PART 1
900
10
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
Y
10
QUESTION 3 PART 1
N0
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
N
10
QUESTION 4 PART 2
NO
10
QUESTION 4 PART 3
Y
9
QUESTION 4 PART 4
DONT KNOW
10
QUESTION 4 PART 5
N
10
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
NO
10
QUESTION 4 PART 3
YES
10
QUESTION 4 PART 4
YES
10
QUESTION 4 PART 5
N0
10
QUESTION 5 PART 1
N
10
QUESTION 5 PART 2
N
110
QUESTION 5 PART 1
NO
10
QUESTION 5 PART 2
NO
10
QUESTION 6 PART 1
N
7
QUESTION 6 PART 2
N
9
QUESTION 6 PART 3
Y
9
QUESTION 6 PART 1
NO
10
QUESTION 6 PART 2
YES
10
QUESTION 6 PART 3
NO
10
QUESTION 7 PART 1
D.A
9
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
D
6
QUESTION 8 PART 2
DIFF ECONOMIES
9
QUESTION 8 PART 1
STARBASE A
10
QUESTION 8 PART 2
THEY OCCUPY DIFFERENT AREAS IN SPACE
10

SESSION NS.

1	1	54548	19898	1500
0	1	47846	19745	0
0	0	50777	19742	0
0	1	69034	19814	0
5	13	12645	0	3500
2	2	13765	0	0

COMMANDS
MIMIGMGMMMG
2 3
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	8	0	0	0	0
0	0	4	0	0	0
0	2	3	0	0	0
0	1000	0	0	0	0
0	8	0	0	0	0
0	0	4	0	0	0

1	1	54548	47460	0
0	1	47846	48994	8000
1	1	50777	74255	0
0	1	69034	52474	0
2	6	827	0	2000
4	0	18906	0	0

COMMANDS
1661111MSG
92
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	0	0	0	0
0	2	0	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	0	0	0	0

SESSION NS.

QUESTION 1 PART 1
5
9
QUESTION 1 PART 1
0
10
QUESTION 2 PART 1
N
9
QUESTION 2 PART 2
Y
10
QUESTION 2 PART 1
NO
10
QUESTION 2 PART 2
NO
10
QUESTION 3 PART 1
N
7
QUESTION 3 PART 1
NO
10
QUESTION 4 PART 1
N
7
QUESTION 4 PART 2
Y
6
QUESTION 4 PART 3
Y
7
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
YES
10
QUESTION 4 PART 3
NO
10

QUESTION 5 PART 1
B OR C OR D
10
QUESTION 5 PART 1
NA
10
QUESTION 6 PART 1
NA
10
QUESTION 6 PART 2
NA
10
QUESTION 6 PART 1
STARBASE B
10
QUESTION 6 PART 2
DIFFERENT CONSTRUCTIONS
10
QUESTION 7 PART 1
DECREASE
6
QUESTION 7 PART 1
INCREASE
10
QUESTION 8 PART 1
NA
10
QUESTION 8 PART 1
NA
10

SESSION N6.

0	1	63267	19698	1500
1	1	46298	17745	0
0	0	58524	19742	0
1	0	72473	19814	0
5	13	6845	0	5000
2	2	13765	0	0

COMMANDS
IGIIMMMGMG
2 43
CRACKS
0 0 0 0 0 0 0

TACTICS

1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0

1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0

1	1	63267	47460	500
0	0	46298	46994	8000
0	1	58524	74255	0
0	0	72473	52474	0
2	4	11340	0	2500
4	0	14186	0	0

COMMANDS
MG166666M1
14329
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

CABIN 1 SENDING.SESSION 6
I AM AT BAS A WHERE ARE THERE A LARGE PUNCH OF KLIN -
TOUGH
CABIN 1 SENDING.SESSION 6
I MEAN THERE ARNT ANY AT A OR NOW ANY AT D. WHERE ARE THEY
ASK INFO ON NEXT CHANCE
CABIN 2 SENDING.SESSION 6
KLINGS BETWEEN C AND D
YES JUST SEEN THEM I GO UP TO B AND A BIT RIGHT
CABIN 2 SENDING.SESSION 6
MY SHIPS AT A AND C RESPECTIVELY
MNE AT A AND AT CRACK BETWEEN D ANB
CABIN 2 SENDING.SESSION 6
PROCEEDING TO B SECTOR TO DESTROY ALL KLINGONS THERE
IM JUST ABOUT TO KILL THE TWO AT RIGHT OF B
CABIN 2 SENDING.SESSION 6
OK YOU TAKE B KLINGS I LL TRY LEFT OF C OK
O.K NOW CAPITAIN

SESSION N6.

QUESTION 1 PART 1
6
7
QUESTION 1 PART 1
8
10
QUESTION 2 PART 1
9 I THINK
10
QUESTION 2 PART 1
0
10
QUESTION 3 PART 1
NA
10
QUESTION 3 PART 2
NA
10
QUESTION 3 PART 1
12000
10
QUESTION 3 PART 2
15000
10
QUESTION 4 PART 1
5
8
QUESTION 4 PART 1
1
10
QUESTION 5 PART 1
BASE D
10
QUESTION 5 PART 2
DIAGONAL OPPOSITE ON SCAN
9
QUESTION 5 PART 1
STARBASE B
10
QUESTION 5 PART 2
DIFFERENT CREATURES IN COMMAND
10
QUESTION 6 PART 1
NA
10
QUESTION 6 PART 1
2
10
QUESTION 7 PART 1
WHAT MEENEST THOUGH
0
QUESTION 7 PART 1
3
10
QUESTION 8 PART 1
FORGOTTEN
10
QUESTION 8 PART 1
48000
10

SESSION N7.

0	0	71821	19898	1500
0	1	64566	19745	0
0	0	76110	19742	0
0	1	77797	19814	0
5	13	2145	0	6500
2	2	17765	0	0

COMMANDS
MGIMGIMGMI
2 3 7
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	1000	0	0	0	0
0	8	0	0	0	0
0	1	9	0	0	0

0	2	3	0	0	0
0	1000	0	0	0	0
0	8	3	0	0	0
0	1	9	0	0	0

0	1	71821	47460	500
0	1	64566	48994	8000
0	1	76110	74255	0
0	1	77797	52474	0
2	6	8640	0	4500
8	0	11456	0	0

COMMANDS
4MDI4MII4M
0
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	0	0	0	0

0	2	3	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	0	0	0	0

SESSION N7.

QUESTION 1 PART 1
29
5
QUESTION 1 PART 1
3
10
QUESTION 2 PART 1
8000
7
QUESTION 2 PART 2
10000
7
QUESTION 2 PART 1
9490
10
QUESTION 2 PART 2
11450
10
QUESTION 3 PART 1
3
3
QUESTION 3 PART 1
NA
10
QUESTION 4 PART 1
Y
6
QUESTION 4 PART 2
Y
5
QUESTION 4 PART 3
N
7
QUESTION 4 PART 4
N
9
QUESTION 4 PART 5
N
8
QUESTION 4 PART 1
NO
10
QUESTION 4 PART 2
NO
10
QUESTION 4 PART 3
YES
10
QUESTION 4 PART 4
YES
10
QUESTION 4 PART 5
NO
10

QUESTION 5 PART 1
A OR CO RO D
9
QUESTION 5 PART 1
NA
10
QUESTION 6 PART 1
NA
1
QUESTION 6 PART 2
NA
1
QUESTION 6 PART 1
STARBASE C
10
QUESTION 6 PART 2
TOTALLY
10
QUESTION 7 PART 1
2
9
QUESTION 7 PART 1
2
10
QUESTION 8 PART 1
I FORGOT TO LOOK
9
QUESTION 8 PART 1
48000
10

```
SESSION NO.
 0          0          90536      19898      1500
 1          1          82093      19745      0
 0          0          88573      19742      0
 0          1          93879      19814      500
 5          13         21200      0          7500
 2          2          13765      0          0

COMMANDS
MGIIGMIMGI
  28   6   3
CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          2          3          0          0          0
 0          1000       0          0          0          0
 0          8          0          0          0          0
 0          2          11         0          0          0


 0          2          3          0          0          0
 0          1000       0          0          0          0
 0          8          0          0          0          0
 0          2          11         0          0          0


 0          0          90536      47460      500
 0          1          82093      48994      8000
 0          1          88573      74255      0
 0          0          93879      52474      0
 2          6          3440       0          5500
 11         0          11206      0          0

COMMANDS
DIIIMDMIMD
  24   8
CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          2          3          0          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          3          0          0          0          0


 0          2          3          0          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          3          0          0          0          0
```



```
SESSION NO.

QUESTION  1   PART  1
N
9
QUESTION  1   PART  2
N
9
QUESTION  1   PART  1
NO
10
QUESTION  1   PART  2
NO
10
QUESTION  2   PART  1
NA
9
QUESTION  2   PART  1
NO
10
QUESTION  3   PART  1
N
9
QUESTION  3   PART  2
Y
9
QUESTION  3   PART  1
NO
10
QUESTION  3   PART  2
NO
10
QUESTION  4   PART  1
Y
7
QUESTION  4   PART  2
N
3
QUESTION  4   PART  1
YES
10
QUESTION  4   PART  2
NO
10
QUESTION  5   PART  1
NO
9
QUESTION  5   PART  2
NA
9
QUESTION  5   PART  1
STARBASE A
10
QUESTION  5   PART  2
COMPLETELY
10
QUESTION  6   PART  1
INCREASE
10
QUESTION  6   PART  1
INCREASE
10
QUESTION  7   PART  1
NA
10
QUESTION  7   PART  1
NA
10
QUESTION  8   PART  1
NA
10
QUESTION  8   PART  1
3
10
```

SESSION N9.

0	1	98286	19898	1500
0	1	82029	19745	0
0	1	92906	19742	0
0	0	105238	19814	500
5	13	15400	0	8500
2	2	13765	0	0

COMMANDS
MIMIMGIMIM
2 8 6 7
CRACKS
0 0 0 0 0 0 0

TACTICS

1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0
1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0

0	1	98286	47460	500
0	1	82020	48994	8000
0	0	92906	74255	0
1	0	15400	52474	0
2	6	3440	0	6500
12	0	5906	0	0

COMMANDS
6614142661
23 26
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

CABIN 2 SENDING.SESSION 9
3 KLINGS IN SECTOR D I AM NEAR 2 ON LEFT AND CAN DESTROY
GOOD OH! I WILL TRY FOR THE OTHER ONE
CABIN 2 SENDING.SESSION 9
ONLY 1 KLING LEFT IN SECTOR D BOTTOM LEFT-CAN YOU GET IT
YES AM MANOUVERING NOW I GOT ONE OF YOURS BY MISTAKE

SESSION N9.

QUESTION 1 PART 1
5
9
QUESTION 1 PART 1
2
10
QUESTION 2 PART 1
N
9
QUESTION 2 PART 1
NO
10
QUESTION 3 PART 1
Y
9
QUESTION 3 PART 2
N
9
QUESTION 3 PART 3
N
9
QUESTION 3 PART 4
N
9
QUESTION 3 PART 5
N
9
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
NO
10
QUESTION 3 PART 3
YES
10
QUESTION 3 PART 4
YES
10
QUESTION 3 PART 5
NO
10

QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 4 PART 1
NA
10
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 3
NA
10
QUESTION 5 PART 1
B OR C OR D
10
QUESTION 5 PART 2
NA
9
QUESTION 5 PART 1
STARBASE
10
QUESTION 5 PART 2
IN EVERY WAY
10
QUESTION 6 PART 1
NA
9
QUESTION 6 PART 1
NA
10
QUESTION 7 PART 1
105000
6
QUESTION 7 PART 1
NA
10
QUESTION 8 PART 1
STARSHIP
0
QUESTION 8 PART 2
STARSHIPS KILL
9
QUESTION 8 PART 1
SHIP
10
QUESTION 8 PART 2
SHIPS DO NOT MOVE ON FIXED ROUTES
10

SESSION N10.

0	1	112221	112941	1560
0	1	96974	97720	0
0	1	95006	95831	0
0	1	114988	116860	500
5	13	13800	0	8500
2	2	11565	0	0

COMMANDS
GII,116161
9862 3 4
CRACKS
0 0 0 0 0 0 0

TACTICS

1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0
1	0	3	0	0	0
500	0	0	0	0	0
2	0	0	0	0	0
1	0	1	0	0	0

1	0	112221	47460	3500
0	;	96974	48994	8000
0	0	95006	74255	0
1	0	114988	52474	5000
2	6	23342	0	6500
12	0	24577	0	0

COMMANDS
11666GMMS1
238
CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

CABIN 2 SENDING.SESSION 10
GOOD SHOT AMIGO = NO KLINGSLEFTTIME FOR COFFEE MAYBE
LETS MEND ANY HOLES FIRST E'!

SESSION N10.

QUESTION 1 PART 1
5000
9
QUESTION 1 PART 1
0
10
QUESTION 2 PART 1
YY
9
QUESTION 2 PART 2
Y
9
QUESTION 2 PART 1
YES
10
QUESTION 2 PART 2
NO
10
QUESTION 3 PART 1
N
99
QUESTION 3 PART 2
Y
9
QUESTION 3 PART 1
NO
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
B OR C OR D
9
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 1
STARBASE A
10
QUESTION 4 PART 2
UTTRERLY
10
QUESTION 5 PART 1
INCREASE
10
QUESTION 5 PART 1
INCREASE
10
QUESTION 6 PART 1
200000
9
QUESTION 6 PART 1
96000
10
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 2
NA
0
QUESTION 7 PART 1
SHIP
10
QUESTION 7 PART 2
SHIPS DO NOT MOVE ON FIXED ROUTES
10
QUESTION 8 PART 1
NA
0
QUESTION 8 PART 2
NA
9
QUESTION 8 PART 3
NA
9
QUESTION 8 PART 1
SHIP,FFREIGHTER-KLINGON
10
QUESTION 8 PART 2
ALLIES
10
QUESTION 8 PART 3
ENEMY
10

```
SESSION N11.
 0          1          126758     127128     1500
 0          1          108684     109034     0
 0          1          110894     110764     0
 0          1          133556     133865     500
 5          13         10000      2          8500
 2          2          11165      0          0

COMMANDS
GGRRIIIIII
    986231
CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          2          3          4          0          0
 0          1000       0          0          0          0
 0          8          0          0          0          0
 0          2          13         1          0          0


 0          2          3          4          0          0
 0          1000       0          0          0          0
 0          8          0          0          0          0
 0          2          13         1          0          0



 1          1          126758     47460      18792
 0          1          108684     48994      8000
 0          0          110894     74255      0
 0          1          133556     52474      5000
 2          6          15292      0          6500
 12         0          19577      0          0

COMMANDS
MMMRIIIGMM
    236
CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          2          3          0          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          5          0          0          0          0


 0          2          3          0          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          5          0          0          0          0


CABIN 1 SENDING.SESSION  11
ALL HOLES MENDED-ANY CRACKS YOU KNOW OF.
NO -ALL CLEAR HERE-    FF
CABIN 2 SENDING.SESSION  11
NO HOLES,CRACKS OR KLINGS-CHECK
```



```
SESSION N11.
QUESTION  1  PART  1
0
10
QUESTION  1  PART  1
NONE
10
QUESTION  2  PART  1
0
10
QUESTION  2  PART  1
ALL GONE
10
QUESTION  3  PART  1
9500
8
QUESTION  3  PART  2
8650
6
QUESTION  3  PART  1
13000
9
QUESTION  3  PART  2
15000
8
QUESTION  4  PART  1
N
9
QUESTION  4  PART  2
Y
9
QUESTION  4  PART  3
N
9
QUESTION  4  PART  1
NA
10
QUESTION  4  PART  2
NA
10
QUESTION  4  PART  3
NA
10
QUESTION  5  PART  1
RCORD
9
QUESTION  5  PART  2
NA
10
QUESTION  5  PART  1
STARBASE A
10
QUESTION  5  PART  2
VERY,SEE BEFORE
10
QUESTION  6  PART  1
NA
9
QUESTION  6  PART  1
NA
10
QUESTION  7  PART  1
NA
9
QUESTION  7  PART  2
NA
9
QUESTION  7  PART  1
SHIP
10
QUESTION  7  PART  2
SHIPS CAN FREELY MOVE
10
QUESTION  8  PART  1
NA
9
QUESTION  8  PART  2
NA
10
QUESTION  8  PART  3
NA
9
QUESTION  8  PART  1
SHIP,FREIGHTER-KLINGON
10
QUESTION  8  PART  2
ALLIES
10
QUESTION  8  PART  3
RADDIE
10
```

SESSION N12.

0	1	140672	127128	1500
0	1	123050	109034	0
0	0	121190	110784	0
1	1	151502	133865	500
5	13	9450	2	8500
2	2	1058	0	0

COMMANDS
11666GG77M
1236R
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	4	0	0
0	1000	0	0	0	0
0	0	0	0	0	0
0	3	13	2	0	0

0	2	3	4	0	0
0	1000	0	0	0	0
0	0	0	0	0	0
0	3	13	2	0	0

1	1	140672	47460	11792
0	0	123050	48994	8000
0	0	121190	74255	0
0	0	151502	52474	5000
2	6	10397	0	6500
12	0	17583	0	0

COMMANDS
IIIIG2SMMM
2634
CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	6	0	0	0	0

0	2	3	0	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	5	0	0	0	0

CARIN 1 SENDING.SESSION 12
CHECK AGAIN HOLES,CRACKS.
STILL CLEAR OVER HERE,MON BRAVE.
CARIN 2 SENDING.SESSION 12
WE SEEM TO HAVE DEFEATED KLINGS.
GOOD-IVE HAD ENOUGH WHAT SAY.
CARIN 1 SENDING.SESSION 12
ONE LAST LOOK,THEN.
ALRIGHT-THINK WEVE FINISHED.

SESSION N12.
QUESTION 1 PART 1
5
9
QUESTION 1 PART 1
0
10
QUESTION 2 PART 1
N
9
QUESTION 2 PART 1
NO
10
QUESTION 3 PART 1
Y
7
QUESTION 3 PART 2
N
3
QUESTION 3 PART 1
YES
10
QUESTION 3 PART 2
NO
10
QUESTION 4 PART 1
B OR C ORD
9
QUESTION 4 PART 2
NA
10
QUESTION 4 PART 1
BASE A
10
QUESTION 4 PART 2
UTTERLY AS BEFORE
10
QUESTION 5 PART 1
19000
9
QUESTION 5 PART 1
20000
10
QUESTION 6 PART 1
NA
0
QUESTION 6 PART 2
NA
0
QUESTION 6 PART 3
NA
0
QUESTION 6 PART 1
SHIP,FREIGHTER,KLING.
10
QUESTION 6 PART 2
FRIENDLY
10
QUESTION 6 PART 3
HOSTILE
10
QUESTION 7 PART 1
NA
10
QUESTION 7 PART 1
50%
10
QUESTION 8 PART 1
14000
K
QUESTION 8 PART 1
12000
6

RECORD 8

SESSION N1.

1	1	18247	0	0
0	0	18663	0	0
1	0	18069	0	0
0	0	17926	0	0
3	0	6500	0	500
0	0	6600	0	0

COMMANDS
27G7G7GG76
3

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	1	0	0	0	0
0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	1	0	0	0	0

0	1	18247	0	0
0	1	18663	0	0
0	1	18069	0	0
1	0	17926	0	0
1	0	9000	0	1000
2	1	8850	0	0

COMMANDS
SM24MDD213

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

SESSION N1.

QUESTION 1 PART 1
0
7
QUESTION 1 PART 1
2
9
QUESTION 2 PART 1
0
6
QUESTION 2 PART 1
2
7
QUESTION 3 PART 1
5
9
QUESTION 3 PART 1
3
5
QUESTION 4 PART 1
1000
6
QUESTION 4 PART 1
DONT KNOW
0
QUESTION 5 PART 1
6500
6
QUESTION 5 PART 2
7000
6
QUESTION 5 PART 1
9000
7
QUESTION 5 PART 2
9500
7

QUESTION 6 PART 1
NA
9
QUESTION 6 PART 2
NA
9
QUESTION 6 PART 3
NA
9
QUESTION 6 PART 4
NA
9
QUESTION 6 PART 5
NA
9
QUESTION 6 PART 1
DONT KNOW
0
QUESTION 6 PART 2
N
2
QUESTION 6 PART 3
N
2
QUESTION 6 PART 4
N
2
QUESTION 6 PART 5
N
2
QUESTION 7 PART 1
2
5
QUESTION 7 PART 1
OPTION 1
3
QUESTION 8 PART 1
1
5
QUESTION 8 PART 1
OPTION 1
2

SESSION N2.

1	1	16142	0	6000
0	1	16482	0	0
1	1	15682	0	5000
0	1	15769	0	0
3	0	5950	0	1500
0	0	1885	0	0

COMMANDS
1171117MM
2

CRACKS
0 0 0 0 0 0 0

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	1	0	0	0	0
0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	1	2	0	0	0

1	1	16142	17587	0
0	1	16482	18147	0
0	1	15682	17395	0
1	1	15769	17493	0
1	0	6850	0	1000
2	1	8350	0	0

COMMANDS
S11M23M1MS
39

CRACKS
0 0 0 0 0 0 0

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

SESSION N2.

QUESTION 1 PART 1
3
7
QUESTION 1 PART 1
0
6
QUESTION 2 PART 1
500
6
QUESTION 2 PART 1
DONT KNOW
0
QUESTION 3 PART 1
3
9
QUESTION 3 PART 1
DONT KNOW
0
QUESTION 4 PART 1
NOTT SURE
5
QUESTION 4 PART 2
I THINK SO
8
QUESTION 4 PART 1
YES
3
QUESTION 4 PART 2
NO
3
QUESTION 5 PART 1
Y
5
QUESTION 5 PART 2
N
9
QUESTION 5 PART 1
YES
4
QUESTION 5 PART 2
NO
4
QUESTION 6 PART 1
B C D
9
QUESTION 6 PART 1
DONT KNOW
0
QUESTION 7 PART 1
ANY OTHER BASE
9
QUESTION 7 PART 2
DIFFERENT ARCHITECTURE AS SHOWN IN COMAND MANUAL
9
QUESTION 7 PART 1
BASE B
2
QUESTION 7 PART 2
NOT SURE YET
0
QUESTION 8 PART 1
DONT KNOW YET MUST FIND OUT
9
QUESTION [illegible]
8000
9

```
SESSION N3.
 1          1          13876      16142      7000
 0          1          14781      16482      0
 0          1          13538      15682      5000
 0          1          13468      15769      0
 3          0          1758       0          3000
 0          0          3119       0          0

COMMANDS
I716147MGM
9  3

CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          2          3          4          0          0
 0          500        0          0          0          0
 0          6          0          0          0          0
 0          1          1          0          0          0


 0          2          3          4          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          2          3          0          0          0


 0          1          13876      14311      0
 0          1          14781      14979      0
 0          1          13538      13908      0
 1          1          13468      13774      600
 1          0          9144       0          1000
 2          1          6150       0          0

COMMANDS
66666MMSII
89231   9

CRACKS
 0   0   0   0   0   0   0

TACTICS

 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0


 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0
 0          0          0          0          0          0
```



```
SESSION N3
QUESTION  1   PART  1
7 BUT NOT KEEPING COUNT
7
QUESTION  1   PART  1
NONE
10
QUESTION  2   PART  1
STILL 3
9
QUESTION  2   PART  1
 THREE
5
QUESTION  3   PART  1
3
9
QUESTION  3   PART  1
 1
7
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
Y
9
QUESTION  4   PART  3
N
9
QUESTION  4   PART  1
NO
3
QUESTION  4   PART  2
YES
3
QUESTION  4   PART  3
NO
3
QUESTION  5   PART  1
B C D
9
QUESTION  5   PART  1
 B C AND D
3
QUESTION  6   PART  1
ANY BASE
9
QUESTION  6   PART  2
DIFFERENT BUILDINGS
9
QUESTION  6   PART  1
 BASE C
5
QUESTION  6   PART  2
 LESS PROSPEROUS AT THIS TIME
6
QUESTION  7   PART  1
DECREASE
9
QUESTION  7   PART  1
 DECREASE
6
QUESTION  8   PART  1
15000
6
QUESTION  8   PART  1
 APPROXIMATELY 10,000
5
```

SESSION N4.

0	1	12125	12738	7000
0	1	13241	13775	0
1	1	10944	11718	5000
0	1	11273	11832	0
3	2	2654	1	3000
2	2	2519	0	0

COMMANDS
D73SDGM6CC
9

CRACKS
0 0 0 1 0 0 1

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	2	1	0	0	0

0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	3	1	0	0

1	1	12125	12646	400
0	1	13241	13672	0
0	1	10944	11603	0
0	1	11273	11765	600
1	0	9144	0	1500
3	1	5084	1	0

COMMANDS
S666521614
293 9

CRACKS
0 0 0 1 0 0 1

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

CABIN 2 SENDING.SESSION 4
BASE D EENERGY HAS BEEEN VEERY LOW-DO YOU KNOW WHY
NO I WAS GOING TO AK YOU. I OPERATING A AND C
CABIN 1 SENDING.SESSION 4
BASE D IS NOW 1182 HERE
I'VE JUST GOT 11765-WHATS HAPPENING
CABIN 1 SENDING.SESSION 4
SORRY YOU RIGHT I MIS TYPED
STILL DONT UNDERSTAND THOUGH

SESSION N4.

QUESTION 1 PART 1
3
8
QUESTION 1 PART 1
1
10
QUESTION 2 PART 1
500
4
QUESTION 2 PART 1
DONT KNOW
0
QUESTION 3 PART 1
Y
9
QUESTION 3 PART 2
Y
9
QUESTION 3 PART 1
NO
9
QUESTION 3 PART 2
NOT RECENTLY BUT A CRACK I THINK
5
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
N
9
QUESTION 4 PART 3
N
9
QUESTION 4 PART 4
N
9
QUESTION 4 PART 5
Y
9
QUESTION 4 PART 1
NO
5
QUESTION 4 PART 2
NO
0
QUESTION 4 PART 3
NO
0
QUESTION 4 PART 4
NO
0
QUESTION 4 PART 5
NO
0

QUESTION 5 PART 1
N
9
QUESTION 5 PART 2
YY
9
QUESTION 5 PART 1
YES
5
QUESTION 5 PART 2
NO
3
QUESTION 6 PART 1
N
9
QUESTION 6 PART 2
Y
9
QUESTION 6 PART 3
N
9
QUESTION 6 PART 1
YES
7
QUESTION 6 PART 2
NO
4
QUESTION 6 PART 3
YES
5
QUESTION 7 PART 1
B C D
9
QUESTION 7 PART 1
PROBARLY NONE
3
QUESTION 8 PART 1
ANY BASE
9
QUESTION 8 PART 2
DIFFERENT BULDINGS
9
QUESTION 8 PART 1
BASE B
2
QUESTION 8 PART 2
DIFFEREENT ECONOMICS
6

SESSION N5.

0	0	10256	12738	7000
0	1	10604	13775	0
1	1	8713	11718	5206
0	1	9283	11632	0
3	2	4542	1	3500
2	2	2119	0	0

COMMANDS
IMMMGGMIM6
3 3 2

CRACKS
0 0 0 1 0 0 1

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	3	2	0	0	0

0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	2	3	1	0	0

1	0	10256	12646	634
0	1	10604	13672	0
0	1	8713	11603	0
0	1	9283	11765	600
1	0	6894	0	1500
3	1	5660	1	0

COMMANDS
2166M111MI
81 2

CRACKS
0 0 0 1 0 0 1

TACTICS

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

SESSION N5.

QUESTION 1 PART 1
GOD KNOWS
1
QUESTION 1 PART 1
0
8
QUESTION 2 PART 1
NOT THIS SET
9
QUESTION 2 PART 2
NOT THIS SET
9
QUESTION 2 PART 1
NO
10
QUESTION 2 PART 2
NO
10
QUESTION 3 PART 1
N
9
QUESTION 3 PART 1
YES
9
QUESTION 4 PART 1
N
9
QUESTION 4 PART 2
Y
9
QUESTION 4 PART 3
N
9
QUESTION 4 PART 1
YES
7
QUESTION 4 PART 2
NO
7
QUESTION 4 PART 3
NO
3

QUESTION 5 PART 1
A C D
9
QUESTION 5 PART 1
NONE
5
QUESTION 6 PART 1
ANY BASE
9
QUESTION 6 PART 2
DIFFERENT BUILDINGS
9
QUESTION 6 PART 1
A
3
QUESTION 6 PART 2
NOT SURE
8
QUESTION 7 PART 1
DECREASE
5
QUESTION 7 PART 1
DECREASE
6
QUESTION 8 PART 1
DUMB QUESTION .NA
10
QUESTION 8 PART 1
-1
6

SESSION N6.

1	0	8373	12736	7000
0	1	8975	13775	0
0	0	6880	11718	5200
0	0	7250	11832	0
3	2	1942	1	5000
3	2	569	1	0

COMMANDS
MDCM161G71
S

CRACKS
0 0 1 1 0 0 2

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	3	3	0	0	0

0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	3	1	0	0

1	1	8373	12646	678
0	0	8975	13672	0
0	0	6880	11693	0
0	0	7250	11765	600
1	0	5647	0	2000
3	1	4610	1	0

COMMANDS
MMRCIMGGCM

CRACKS
0 0 1 1 0 0 2

TACTICS

0	2	0	0	0	0
0	5000	0	0	0	0
0	2	0	0	0	0
0	1	0	0	0	0

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

CABIN 1 SENDING.SESSION 6
OOOPS CRACK BETWEEN A C AM A BIT LEFT OF A C ON CRACK
I'M BY THEE GAP NEAR FREIGHTERWILL TRY REPAIR
CABIN 2 SENDING.SESSION 6
AREN'T YOU THEERE YET-RPAIR WAS IMPOSSIBLE
I AM NOW 3 HOLE TO LEFT OF END OF CRACK
CABIN 2 SENDING.SESSION 6
[illegible] GO TO A [illegible] GAP [illegible] BOTTOM
TRYING TO BE PATIENT NOWADAYS I HAVE TO KEEP MY ENERGY UP

SESSION N6.

QUESTION 1 PART 1
NA
1
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
1000
5
QUESTION 2 PART 1
500
3
QUESTION [illegible] PART 1
1500
7
QUESTION 3 PART 2
JUST DOCKED NA
9
QUESTION 3 PART 1
6387
5
QUESTION 3 PART 2
3800
2
QUESTION 4 PART 1
3
3
QUESTION 4 PART 1
1
10
QUESTION 5 PART 1
NO
9
QUESTION 5 PART 2
NA
9
QUESTION 5 PART 1
BASE C
3
QUESTION 5 PART 2
NUMBER OF TRADE ROUTES
2
QUESTION 6 PART 1
NA
1
QUESTION 6 PART 1
OPTION 3
6
QUESTION 7 PART 1
NA
10
QUESTION 7 PART 1
OPTION 1
7
QUESTION 8 PART 1
NA
10
QUESTION 8 PART 1
10,000
1

SESSION N7.

1	1	6221	12738	7000
0	1	6635	13775	0
0	1	4695	11718	5200
0	0	5209	11832	0
3	5	892	1	5500
3	2	442	1	0

COMMANDS
!!!!!!!!M5

CRACKS
0 0 1 1 0 0 2

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	3	3	0	0	0

0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	3	3	1	0	0

1	1	6221	8331	735
0	1	6635	8908	0
0	1	4695	6776	0
0	1	5209	7225	600
2	0	5979	0	2500
3	1	2150	1	0

COMMANDS
!!!G7G7713
9

CRACKS
0 0 1 1 3 0 2

TACTICS

0	2	0	4	0	0
0	5000	0	0	0	0
0	2	0	0	0	0
0	2	0	0	0	0

0	2	0	4	0	0
0	7000	0	0	0	0
0	4	0	0	0	0
0	0	0	1	0	0

CABIN 1 SENDING.SESSION 7
TRY REPAIR AT A/B NOW HAVE 832 ENERGY ONLY
I'VE GOT MORE SO ILL DO REPAIR-JUST STAY STILL

SESSION N7.

QUESTION 1 PART 1
NA
9
QUESTION 1 PART 1
NONE
10
QUESTION 2 PART 1
1500
7
QUESTION 2 PART 2
800
8
QUESTION 2 PART 1
5470
7
QUESTION 2 PART 2
2250
7
QUESTION 3 PART 1
STILL ONLY 3
9
QUESTION 3 PART 1
3
4
QUESTION 4 PART 1
NA
9
QUESTION 4 PART 2
NA
9
QUESTION 4 PART 3
NA
9
QUESTION 4 PART 4
NA
9
QUESTION 4 PART 5
MAYBE
5
QUESTION 4 PART 1
NO
9
QUESTION 4 PART 2
YES
3
QUESTION 4 PART 3
NO
5
QUESTION 4 PART 4
NO
5
QUESTION 4 PART 5
NO
4

QUESTION 5 PART 1
B C D
9
QUESTION 5 PART 1
BASE B
5
QUESTION 6 PART 1
NOT AGAIN
9
QUESTION 6 PART 2
ASS BEFORE
9
QUESTION 6 PART 1
B
5
QUESTION 6 PART 2
B SENDS TO A-ARECEIVES
5
QUESTION 7 PART 1
NA
9
QUESTION 7 PART 1
OPTION 3
8
QUESTION 8 PART 1
NA
2
QUESTION 8 PART 1
8000
5

SESSION NO.

1	1	4129	12736	7000
0	1	5067	13775	0
0	0	2653	11718	5200
0	0	2974	11832	0
3	10	892	1	5500
3	2	500	1	0

COMMANDS
7711113571

CRACKS
0 0 1 0 0 0 3

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	3	3	0	0	0
0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	5	4	1	0	0

1	0	4129	8331	8!9
0	1	5067	8908	1500
0	0	2653	6776	0
0	0	2974	7225	600
2	0	4561	0	2500
3	1	4981	1	1

COMMANDS
711MMCSRCG

CRACKS
0 0 1 0 0 0 3

TACTICS

0	2	0	4	0	0
0	5000	0	0	0	0
0	2	0	0	0	0
0	3	0	0	0	0
0	2	0	4	0	0
0	7000	0	0	0	0
0	4	0	0	0	0
0	1	0	1	0	0

CABIN 2 SENDING.SESSION 8
IM HARD BY GAP IN A-B CRACK PLEASE NOTIFY YOUR ARIVAL
FINALLY THERE I DOWN 2 LEFT OF BARGE AT BOTTOM
CABIN 1 SENDING.SESSION 8
WHY NO COOPERATION AM NOW DOWN TO 828
I SAID YES & COULD AFFORD IT-DID YOU GET COORDS OK
CABIN 2 SENDING.SESSION 8
ILL GO [illegible] OF OTHER (NY TO GET ENERGY YOURSELF
OK

SESSION NO.

QUESTION 1 PART 1
N
9
QUESTION 1 PART 2
ONCE UPON A TIME
9
QUESTION 1 PART 1
NO
10
QUESTION 1 PART 2
NO
10
QUESTION 2 PART 1
Y
9
QUESTION 2 PART 1
YES
9
QUESTION 3 PART 1
NA
1
QUESTION 3 PART 2
Y
9
QUESTION 3 PART 1
NO
5
QUESTION 3 PART 2
YES
5
QUESTION 4 PART 1
Y
9
QUESTION 4 PART 2
N
9
QUESTION 4 PART 1
MORE LIKE SHIPS
7
QUESTION 4 PART 2
NO
8

QUESTION 5 PART 1
ANY BASE
9
QUESTION 5 PART 2
SEE PICTURES IN MANUAL
9
QUESTION 5 PART 1
A
5
QUESTION 5 PART 2
BASE A RECEIVES FROM B-NOT VICE-VERS
5
QUESTION 6 PART 1
DECREASE
4
QUESTION 6 PART 1
INCREASE
6
QUESTION 7 PART 1
NA
0
QUESTION 7 PART 1
ZERO
2
QUESTION 8 PART 1
1
9
QUESTION 8 PART 1
OPTION 1
7

```
SESSION N9.
 1          0          2027       12738      8492
 0          1          3438       13775      0
 0          1          2000       11718      5200
 0          0          2000       11838      0
 3          15         692        1          5500
 3          2          500        1          0

COMMANDS
1151511M71

CRACKS
 0   0   0   0   0   0   4

TACTICS

 0          2          3          4          0          0
 0          500        0          0          0          0
 0          6          0          0          0          0
 0          3          3          0          0          0


 0          2          3          4          0          0
 0          500        0          0          0          0
 0          2          0          0          0          0
 0          6          4          1          0          0



 1          1          2027       2502       851
 0          1          3438       3960       1500
 0          1          2000       1848       0
 0          1          2000       1760       600
 2          0          2224       0          3000
 3          1          2781       1          2

COMMANDS
MR7GG136CM
        9

CRACKS
 0   0   0   0   0   0   4

TACTICS

 0          2          0          4          0          0
 0          5000       0          0          0          0
 0          2          0          0          0          0
 0          4          0          1          0          0


 0          2          0          4          0          0
 0          7000       0          0          0          0
 0          4          0          0          0          0
 0          1          0          2          0          0

CABIN 1 SENDING.SESSION  9
I DOCK A.GET 1500.MOVE AWAY. HIT INVISIBLE LOSE 1000 .MOVE OVER
AM TOP LEFT OF STATIC FREIGHTERPLEASE RENDEZVOUS
CABIN 1 SENDING.SESSION  9
HAE BEEN WAITING AT RIGHT END OF A/C  CRACK FOR AGGES
WITH YOU IN ONE MOVE-HANG ON
CABIN 2 SENDING.SESSION  9
BASE ENERGIES LOOK BAD-WHAT TO DO NOW-ANY IDEA
SHIPX=600 Y=500 BUT AT DOCK A.NO IDEA ABOUT BASES!
```

```
SESSION N9.

QUESTION  1   PART  1
4
9
QUESTION  1   PART  1
2
4
QUESTION  2   PART  1
Y
9
QUESTION  2   PART  1
YEES
10
QUESTION  3   PART  1
NA
9
QUESTION  3   PART  2
NA
9
QUESTION  3   PART  3
NA
9
QUESTION  3   PART  4
NA
9
QUESTION  3   PART  5
NA
9
QUESTION  3   PART  1
NO
8
QUESTION  3   PART  2
YES
2
QUESTION  3   PART  3
NO
7
QUESTION  3   PART  4
NO
7
QUESTION  3   PART  5
YES
7
QUESTION  4   PART  1
N
9
QUESTION  4   PART  2
Y
9
QUESTION  4   PART  3
N
9
QUESTION  4   PART  1
CO-OPERATE
5
QUESTION  4   PART  2
YES
8
QUESTION  4   PART  3
NO
5
```

```
QUESTION  5   PART  1
ANY BASE
SEE9
QUESTION  5   PART  2
SEE MANUAL
9
QUESTION  5   PART  1
BASE C
5
QUESTION  5   PART  2
CDOESNT TRADE WITH B
5
QUESTION  6   PART  1
WHAT DOES THAT MEAN
0
QUESTION  6   PART  1
IERO
5
QUESTION  7   PART  1
2000
8
QUESTION  7   PART  1
2400
3
QUESTION  8   PART  1
A LORRY
9
QUESTION  8   PART  2
LORRIES CANT MEET KLINGONS
9
QUESTION  8   PART  1
SHIPS ARE SIMILAR
5
QUESTION  8   PART  2
FREIGHTERS MOVE ONLY SLOWLY
8
```

SESSION N10.

1	0	2000	12738	8492
0	1	2000	13 75	0
1	0	2000	11718.	5200
6	0	2000	11932	0
3	19	1450	1	5500
5	2	1400	1	0

COMMANDS
1CGMM12111

CRACKS
0 0 0 0 0 0 4

TACTICS

0	2	3	4	0	0
0	500	0	0	0	0
0	6	0	0	0	0
0	4	3	0	0	0
0	2	3	4	0	0
0	500	0	0	0	0
0	2	0	0	0	0
0	6	4	1	0	0

0	1	2000	1797	851
0	1	2000	2216	1500
1	1	2000	1764	0
0	1	2000	1775	600
2	2	524	0	3000
3	1	500	1	2

COMMANDS
7741IMI1C1
3 9

CRACKS
0 0 0 0 0 0 4

TACTICS

0	2	0	4	0	0
0	5000	0	0	0	0
0	2	0	0	0	0
0	1	0	1	0	0
1	2	0	4	0	0
1000	7000	0	0	0	0
6	4	3	0	0	0
1	1	0	2	0	0

CABIN 1 SENDING.SESSION 10
I WANT TO WITHDRAW MY INVESTMENTS PLEASE HOW.
DONT THINK IT CAN BE DONE
CABIN 2 SENDING.SESSION 10
IM IN VERY AWKWARD TROUBLE AS REGARDS EENEERGY
SO WAS I BUT HAVE SUSSED IT OUT NOW

SESSION N10.

QUESTION PART 1
5 MILLION I. LEEMS
9
QUESTION 1 PART 1
0
9
QUESTION 2 PART 1
N
9
QUESTION 2 PART 2
Y
9
QUESTION 2 PART 1
NO
9
QUESTION 2 PART 2
ONE
7
QUESTION 3 PART 1
N
Y9
QUESTION 3 PART 2
Y
9
QUESTION 3 PART 1
NO
7
QUESTION 3 PART 2
NO
7
QUESTION 4 PART 1
ANY BASE
9
QUESTION 4 PART 2
LOOK IN THE COMMAND MANUAL
9
QUESTION 4 PART 1
BASES B C D
1
QUESTION 4 PART 2
INVESTMENT LEVELS
2

QUESTION 5 PART 1
DECREASE
9
QUESTION 5 PART 1
DECREASE
7
QUESTION 6 PART 1
19000
9
QUESTION 6 PART 1
1500
3
QUESTION 7 PART 1
STARSHIP
2
QUESTION 7 PART 2
SHIPS CAN KILL
9
QUESTION 7 PART 1
KLINGONS
2
QUESTION 7 PART 2
DIFFERENT MOVEMENT
5
QUESTION 3 PART 1
STARSHIP, BARGE KLINGON
9
QUESTION 8 PART 2
BOTH CARRY ENERGY
9
QUESTION 8 PART 3
KLINGONS DETROY BARGES
9
QUESTION 8 PART 1
HOLE CRACK KLINGON
8
QUESTION 8 PART 2
SAME CAUSATION
8
QUESTION 8 PART 3
KLINGONS ARE ACTIVE THE OTHERS ARE PASSIVE
8

6. A Matter of Proper Quantification

Decision appears to be systemic or context dependent. In the course of decision making, any individual can act in many different ways, depending upon context; that being so, a certain doubt is cast upon the usual idea of regarding "heads" as the appropriate units for comparative evaluation.

With small sample data, statistical analysis is hampered by the notion that different heads act as independent entities. There is no reason to suppose that this is a valid assumption in the present case; quite the contrary; one person can adopt several perspectives. Moreover, any one individual is really acting as part of a system that decides, either in team operation or individual operation.

Most small sample studies are plagued by this dilemma even though the overall information may be immense. It is possible (a) to relinquish statistical analysis altogether, and opt for discursive and protocol accounts (but what people say is a far from optimal indication of what they do, or, even, intend to do) or (b) to adopt the unconventional expedient of regarding episodes rather than people, as the independent entities. Tentatively, "episodes" are described by the data recorded after each interrogation #

In our view, it would be justifiable to adopt the latter expedient; that is, to correlate episodes of given kinds.

At this juncture, supported by a fair sample of unanalysed and unadulterated data, I consider again the theoretical arguments of Section 1.3 and Section 1.4; regarding a mission R ; systems in this mission $S_i, S_j \ldots$ that implicate, as parts or subsystems, either one participant (Commander A) or a team (Commanders A and B acting jointly).

The comments in the preface (most of which are the product of discussion with Dr Helme after the draft proposal was submitted) provide an appreciable extension of this idea and should be noted.

Of these entities $\mathcal{R}$ (the mission) is outlined in the framework of Fig 18, and may be specified with as much detail as desired. At some sampling instant $\underline{t}$ it is possible to examine a stretch of behaviour between a previous instant $\underline{t}^*$ and the instant $\underline{t}$. It seems more sensible to concentrate upon episodes; representing the behaviour of certain subsystems $S_i, S_j \ldots$ than it is to pursue "A's behaviour with respect to the task" or "A and B's behaviour together and with respect to the task "throughout the interval $t - t^*$," simply because there is no obvious demarcation (in terms of a decision process), between parts that belong to A, or to B, or to the task.

It is intended to adopt this expedient in the analysis. Individual scores, on stylistic tests, will be referred to several correlated episodes.

7. The Determination of Individual Responsibility

In earlier work with the Glacier project, Elliott Jacques has pointed out the effect of matching or mismatching the time span of an occupation to the responsibility or level, or anticipatory aspiration, of an individual.

Insofar as there is an index of decision quality the index of responsibility; the length of time span that the individual will contemplate, habitually, is probably as good as any, and better than most.

Such an index is calculable from the interrogation and planning mesh data. It seems prudent (as a gross approximation measure), to say that someone is good at deciding in a situation with a given time span, insofar as the personal time span matches this quantity.

Such an index is crude, though potentially valuable. It may be refined, insofar as performance in episodes of the decision making task is individually distinguished by data from tests for conceptual style. Between them, these and the interrogation data, permit a refinement of the index. For these indices also reliably predict competence in performing different types of skill. The idea is to equate responsibility to the task requirement, in the first place; next, to fit the personnel to the clusters of skills that are dominant in the episodes of the decision making task.

8. Conclusions and Some System Developments

The team decision system is created and functions satisfactorily. Non trivial learning takes place to the extent that the system has a training effect. It is possible to predict some aspects of decision making performance on the basis of exteriorised behaviour, and the stylistic tests. One of the more exciting possibilities, and a thoroughly practicable possibility, is use of the system as a decision aid or even, with technically feasible modifications, as a distributed decision system.

Certain desiderates exist, however, and the main desiderata are set out below.

(a) To improve the tactic construction, selection and execution, especially so that one spacecraft may communicate, through tactics, with several of the others to obtain information, or to call for execution of the other spacecraft tactics.

(b) To integrate planning mesh construction, and interrogation.

(c) To provide predictive modelling programs. If certain values (notably, of probabilities) are furnished by the subject as part of interrogation, to furnish the subject, in return, with predictive data based upon these values. This requirement became obtrusive in the context of probabilistic judgements but is, in fact, quite general; if probabilistic (Bayesian) predictions are furnished, then fuzzy, possibilistic, and other, predictions must also be furnished.

(d) To provide a personal log or file for each subject, available on disc with suitable indexing, so that much of the data which is currently hand stored in notes is available on the computer (allowing a record of its storage and retrieval (to be kept). At the moment, it is impracticable to store graphical data but it should be possible to index graphical notes.

These expedients are all means for reducing the arbitrary distinctions, between "operation" and "interrogation", or between "interrogation"and a "planning session".

In particular, integration of the planning session with the operation and interrogation sequence calls for a fairly radical simplification of the THOUGHTSTICKER input process. The modifications required appears too large to contemplate, until it is noted that a slightly expanded form of tactic specification and interrogation, is, as it stands, a nearly adequate input process.

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Appendix 1

List of Simulations Tried out

Appendix 1

After discussions in Washington with Dr E Johnson and Dr J Zeidner, a small collection of military games of known training value and fairly short playing interval were examined for their intelligability (and playability) by subjects at our disposal. Chiefly for terminological reasons these games were deemed unsuitable.

Some management type games, published by Urban Systems Inc, Cambridge, Mass, were given serious consideration, notably "Ecology" and "Urban Dynamics". These proved unsuitable, chiefly because they were not immediately pertinent to a military command and control system and because of the difficulty in exteriorising players "world views" which clearly differ very greatly.

Marketed military games, played by the potential subject pool included "Panzer Blitz" (1970), Avalon Hill Company, "Combat Command" (a platoon level game, 1972) and "Phalanx" which has a scenario in Ancient Greece, both of the latter games are published by Simulation Publications Inc, Baltimore. The reported observations were based upon play of these games and the numerous local variants devised by habitual players.

Appendix 2

Program Used in Studies of Sections 2 and 3

BASIC Listing for earlier Space Task

ORIGINAL SPACE TASK PROGRAMME. BY NICK GREEN.

```
1 CALL(8,-1)
10 LET V(1,0)=V(1,1)=V(1,2)=V(1,3)=1
14 LET M1=M2=B=0
15 LET T2=0
20 LET V(1,4)=3000
30 LET V(1,5)=15
40 LET V(1,6)=V(1,7)=V(1,8)=V(1,9)=V(1,10)=V(1,11)=V(1,12)=0
50 LET J5=4
70 DEF FNA(X)=INT(X*RND(0)+1)
80 DIM G(8,8),Z$(20),C$(6),X$(24)
81 DIM C(9,2),K(3,3),Q(8,8),D(6),M(3),N(4)
82 DIM A$(20)
83 DIM P(3,9,2)
84 DIM D$(10),B$(10),S$(10)
85 DIM V(2,13)
86 LET S$="0123456789"
87LET L1=M1=J1=0
88 DIM S(5,2),E$(2)
89 LET E$="XY"
90 LET T=(FNA(20)+20)*100
91 LET T0=T
100 LET E=3000
110 LET P=15
120 LET S=0
130 LET X$="------------------------"
140 DEF FND(D)=SQR((K(I,1)-S1)^2+(K(I,2)-S2)^2+0.1)
150 LET S2=FNA(8)
151 LET S1=S2
152 LET Q2=S1
153 LET Q1=Q2
160 MAT C= CON
170 LET C(6,2)=-1
171 LET C(5,2)=C(6,2)
172 LET C(4,2)=C(5,2)
173 LET C(4,1)=C(4,2)
174 LET C(3,1)=C(4,1)
175 LET C(2,1)=C(3,1)
180 LET C(9,1)=0
181 LET C(7,2)=C(9,1)
182 LET C(5,1)=C(7,2)
183 LET C(3,2)=C(5,1)
184 LET C(1,1)=C(3,2)
190 MAT D= ZER
200 LET K9=0
201 LET B9=K9
210 FOR I= 1 TO 8
220 FOR J= 1 TO 8
230 LET B3=0
231 LET K3=B3
240 IF RND(0)<.8 THEN 270
250 LET K3=FNA(3)
260 LET K9=K9+K3
270 IF RND(0)<.96 THEN 300
280 LET B3=1
290 LET B9=B9+1
300 LET S3=FNA(5)
310 LET G(I,J)=K3*100+B3*10+S3
320 NEXT J
330 NEXT I
340 IF K9=0 THEN 200
341 IF B9=0 THEN 200
360 IF Q1>=1 THEN 380
370 LET Q1=1
371 LET S1=Q1
380 IF Q1<=8 THEN 400
390 LET Q1=8
391 LET S1=Q1
400 IF Q2>=1 THEN 420
410 LET Q2=1
411 LET S2=Q2
420 IF Q2<=8 THEN 440
430 LET Q2=8
431 LET S2=Q2
440 LET X=G(Q1,Q2)/100
450 LET K3=INT(X)
460 LET B3=INT((X-K3)*10)
470 LET S3=G(Q1,Q2)-((B3*10)+(K3*100))
480 IF K3=0 THEN 520
490 PRINT"COMBAT AREA ","CONDITION RED"
500 IF S>(K3*100) THEN 520
510 PRINT"  SHIELDS DANGEROUSLY LOW"
520 MAT K= ZER
530 MAT Q=ZER
540 LET Q(S1,S2)=1
544 PRINT
550 FOR I= 1 TO K3
551 IF K3>0 THEN 560
552 GOTO620
560 GOSUB 3500
570 LET Q(R1,R2)=2
580 LET K(I,1)=R1
590 LET K(I,2)=R2
600 LET K(I,3)=200
610 NEXT I
620 IF B3=0 THEN 650
630 GOSUB 3500
640 LET Q(R1,R2)=4
645 LET E1=R1
646 LET E2=R2
650 FOR I=1 TO S3
660  GOSUB 3500
670 LET Q(R1,R2)=3
671 LET S(I,1)=R1
672 LET S(I,2)=R2
680 NEXT I
690 GOSUB 2600
700 PRINT"SHIP "E$(B,B)
701 PRINT"COMMAND:"
702 LET J5=1
703 GOSUB 5500
704 IF L4 =100 THEN 701
710 LET A=L3
```

```
714 IF A=3 THEN 720
715 GOSUB 5250
720 IF A<1 THEN 780
721 IF A>5 THEN 780
722 IF A<>INT(A) THEN 780
730 LET R1=A+1
740 IF D(R1)>=0 THEN 780
750 GOSUB 3420
760 PRINT Z$;" NOT OPERATIONAL"
770 GOTO 700
780 ON A+1 GOTO 890,1520,1640,1800,2200,3010,3550,3565,5000
790 PRINT
800 PRINT"0=SET COURSE";TAB(20);"4  3  2"
810 PRINT"1=LONG RANGE SCAN";TAB(21);"\ | /"
820 PRINT"2=PHASER CTRL";TAB(22);"\|/"
830 PRINT"3=TORPEDO CTRL";TAB(18);"5 ------- 1"
840 PRINT"4=SHIELDS";TAB(22);"/|\"
850 PRINT"5=LIBRARY COMPUTER";TAB(21);"/ | \"
860 PRINT"6=RESIGNATION";TAB(20);"6  7  8"
865 PRINT"7=SET TOPOLOGY"
866 PRINT"8=CHANGE SHIP"
870 PRINT
880 GOTO 700
890 PRINT"COURSE (1-9):";
900LET J5=3
901 GOSUB 5500
902 IF L4=100 THEN 900
903 LET C1=L3
910 IF C1<1 THEN 700
911 IF C1>=9 THEN 700
920 PRINT"WARP FACTOR (0-8):";
930 LET J5=2
931 GOSUB 5500
932 IF L4=100 THEN 930
933 LET W1=L3
940 IF W1<=0 THEN 700
9 : IF W1>8 THEN 700
950 IF D(1)>=0 THEN 980
951 IF W1<=.5 THEN 980
960 PRINT"ENGINES ARE DAMAGED"
961 PRINT"MAXIMUM SPEED=WARP.5"
970 GOTO 920
980 IF E-(W1*8)>0 THEN 1030
990 IF S<1 THEN 2470
1000 PRINT"YOU ONLY HAVE";E;"UNITS"
1001 PRINT"SUGGEST YOU CROSS-CIRCUIT"
1010PRINT"FROM SHIELDS NOW AT";S;"UNITS"
1020 GOTO 700
1030 FOR I= 1 TO 8
1040 IF D(I)>=0 THEN 1060
1050 LET D(I)=D(I)+1
1060 NEXT I
1070 IF FNA(10)<>5 THEN 1120
1071 IF W1<2 THEN 1120
1080 LET R1=FNA(6)
1090 LET D(R1)=D(R1)-FNA(5)
1100 GOSUB 3420
1110 PRINT

1111PRINT"DAMAGE CONTROL REPORTS:"
1112PRINT"";Z$;"" DAMAGED."
1120 LET N=INT(W1*8)
1130 LET Q(S1,S2)=0
1140 LET X=S1
1150 LET Y=S2
1160 LET C2=INT(C1)
1170 LET X1=C(C2,1)+(C(C2+1,1)-C(C2,1))*(C1-C2)
1180 LET X2=C(C2,2)+(C(C2+1,2)-C(C2,2))*(C1-C2)
1190FOR I= 1 TO N
1200 LET S1=S1+X1
1210 LET S2=S2+X2
1220 IF S1<1 THEN 1360
1221 IF S1>8 THEN 1360
1222 IF S2<1 THEN 1360
1223 IF S2>8 THEN 1360
1230 IF Q(INT(S1),INT(S2))=0 THEN 1270
1240 LET S1=S1-X1
1250 LET S2=S2-X2
1260 GOTO 1280
1270 NEXT I
1280 LET S1=INT(S1)
1290 LET S2=INT(S2)
1300 LET Q(S1,S2)=1
1310 LET E=E-N
1320 IF W1<1 THEN 690
1330 GOSUB 5800
1335 GOSUB 6000
1340 IF T>T0+30 THEN 1500
1350 GOTO 690
1360 LET X=Q1*8+X+X1*N
1370 LET Y=Q2*8+Y+X2*N
1380 LET Q1=INT(X/8)
1390 LET Q2=INT(Y/8)
1400 LET S1=INT(X-Q1*8+.5)
1410 LET S2=INT(Y-Q2*8+.5)
1415 GOSUB 4300
1420  IF S1>0 THEN 1450
1422 IF T2=1 THEN 1425
1423 IF T2=2 THEN  1425
1424 GOTO 1430
1425 IF Q1=1 THEN 1427
1426 GOTO 1430
1427 LET Q1=8
1428 GOTO 1440
1430 LET Q1=Q1-1
1440 LET S1=8
1450 IF S2>0 THEN 1480
1453 IF T2=2 THEN 1455
1454  GOTO 1460
1455 IF Q2=1 THEN 1457
1456 GOTO 1460
1457 LET Q2=8
1458 GOTO 1470
1460 LET Q2=Q2-1
1470 LET S2=8
1480 GOSUB 5900
1485 GOSUB 6000
```

```
1490 LET E=E-N-ABS(S)
1500 IF T>T0+30 THEN 2500
1510 GOTO 360
1520 PRINT" SRK     SRK     SRK"
1530 FOR I=Q1-1 TO Q1+1
1540 LET Q9=0
1541 MAT N=CON
1550 FOR J= Q2-1 TO Q2+1
1560 LET Q9=Q9+1
1564 LET B6=I
1566 LET B5=J
1570 GOSUB 4000
1575 IF N(Q9)=0 THEN 1581
1580 LET N(Q9)=G(B6,B5)
1581 NEXT J
1582 LET F9=7
1583 FOR F1=1 TO 3
1584 LET A1 =INT(N(F1)/100)
1585 LET A2=INT(N(F1)/10)-10*A1
1586 LET A3=INT(N(F1))-10*A2-100*A1
1587 PRINT  100*A3+10*A2+A1;" ";
1588 IF F1=3 THEN 1596
1589 PRINT TAB(F9);
1590 REM THIS NEEDS FIXING MEANTIME.....
1594 LET F9=14
1595 NEXT F1
1596 PRINT
1600 PRINT"-------------------"
1610 NEXT I
1620 GOTO 700
1640 IF K3=0 THEN 2350
1650 PRINT"ENERGY AVAILABLE=";E
1660 PRINT"NUMBER OF UNITS TO FIRE:"
1670 LET J5=4
1671 GOSUB 5500
1672 IF L4=100 THEN 1670
1673 LET X=L3
1680 IF X<1 THEN 700
1690 IF E-X<0 THEN 1660
1700 LET E=E-X
1710 FOR I= 1 TO 3
1720 IF K(I,3)=0 THEN 1780
1730 LET H=INT(X/FND(0))
1740 LET K(I,3)=K(I,3)-H
1750 PRINT#;"UNIT HIT ON KLINGON"
1760 IF K(I,3)>0 THEN 1780
1770 GOSUB 2050
1780 NEXT I
1790 GOTO 2030
1800 IF P>0 THEN 1830
1810 PRINT"ALL PHOTON TORPEDOES EXPENDED"
1820 GOTO 700
1830 PRINT"TORPEDO COURSE (1-9):";
1840 LET J5=3
1841 GOSUB 5500
1842 IF L4=100 THEN 1840
1843 LET C1=L3
1850 IF C1<1 THEN700
1851 IF C1>=9 THEN 700
1860 LET C2=INT(C1)
1870 LET X1=C(C2,1)+(C(C2+1,1)-C(C2,1))*(C1-C2)
1880 LET X2=C(C2,2)+(C(C2+1,2)-C(C2,2))*(C1-C2)
1890 LET X=S1
1900 LET Y=S2
1910 LET P=P-1
1920 PRINT
1930 LET X=X+X1
1940 LET Y=Y+X2
1950 IF X<1 THEN 2180
1951 IF X>8 THEN 2180
1952 IF Y<1 THEN 2180
1953 IF Y>8 THEN 2180
1960 IF Q(INT(X),INT(Y))=0 THEN 1962
1961  GOTO 1970
1962 IF Q(INT(X+.5),INT(Y+.5)) =0 THEN 1930
1970 FOR I= 1 TO 3
1980 IF INT(X)=K(I,1) THEN 1982
1981 GOTO 1990
1982  IF INT(Y)=K(I,2) THEN 2020
1990 IF INT(X+.5)=K(I,1) THEN 1992
1991 GOTO 2000
1992 IF INT(Y+.5)=K(I,2) THEN 2020
2000 NEXT I
2010 GOTO 2120
2020 GOSUB 2050
2030 GOSUB 2370
2040 GOTO 700
2050 LET Q(K(I,1),K(I,2))=0
2051 LET K(I,3)=0
2060 PRINT"****KLINGON DESTROYED****"
2070 LET K3=K3-1
2080 LET K9=K9-1
2090 IF K9=0 THEN 2550
2100 LET G(Q1,Q2)=G(Q1,Q2)-100
2110 RETURN
2120 IF Q(INT(X),INT(Y))=4 THEN 2150
2125 IF Q(INT(X),INT(Y))=3 THEN 2130
2126 IF Q(INT(X),INT(Y))=1 THEN 2165
2130 PRINT"YOU CAN'T DESTROY STARS, SILLY!"
2140 GOTO 2181
2150 PRINT"***STARBASE DESTROYED***"
2160 PRINT"YOU ARE HEREBY RELIEVED OF DUTY!!  CONGRATULATIONS!"
2164 GOTO 2170
2165 PRINT"SHIP";B;"DESTROYED"
2170 GOTO 2530
2180PRINT
2181 PRINT"TORPEDO MISSED"
2190 GOTO 2030
2200 PRINT"ENERGY AVAILABLE=";E+S
2210 PRINT"NUMBER OF UNITS TO SHIELDS:";
2220 LET J5=3
2221 GOSUB 5500
2222 IF L4=100 THEN 2200
2223 LET X=L3
2230 IF X<0 THEN 700
2240 IF E+S-X<0 THEN 2210
2250 LET E=E+S-X
2260 LET S=X
```

```
2270 GOTO 700
2280 PRINT
2281 PRINT"DEVICE" ,"STATE OF REPAIR"
2290  FOR R1 =1 TO 6
2300  GOSUB 3420
2310 PRINT Z$,D(R1)
2320 NEXT R1
2330 PRINT
2340 GOTO 700
2350PRINT"SHORT RANGE SENSORS REPORT"
2351 PRINT"NO KLINGONS IN THIS QUADRANT"
2360 GOTO 700
2370 IF C$="DOCKED" THEN 2460
2380 ;  K3=0 THEN 2460
2390 FOR I= 1 TO 3
2400 IF K(I,3)=0 THEN 2450
2410 LET H=INT(K(I,3)/FND(0)+1)
2420  LET S=S-H
2430 PRINT H;"UNIT HIT ON SHIP ";ES(B,B)
2440 IF S<0 THEN 2520
2450  NEXT I
2460 RETURN
2470 PRINT"**FATAL ERROR**"
2480 PRINT"SHIP ";ES(B,B);" IS DEAD IN SPACE"
2481 PRINT"*****EVACUATE*****"
2490 GOTO 2530
2500 PRINT
2501 PRINT"IT IS STARDATE";T
2510 GOTO 2530
2520 PRINT
2521 PRINT"***SHIP ";ES(B,B);"***"
2522 PRINT"HAS BEEN DESTROYED"
2530 PRINT
2531 PRINT"THE FEDERATION WILL BE CONQUERED"
2540 GOTO 3560
2550 PRINT
2560 PRINT"THE LAST KLINGON BATTLE CRUISER"
2561 PRINT"HAS BEEN DESTROYED"
2570 PRINT"THE FEDERATION HAS BEEN SAVED!!"
2580 PRINT
2590 GOTO 3560
2600  FOR I=S1-1 TO S1+1
2610 FOR J=S2-1 TO S2+1
2620 IF I<1 THEN 2640
2621 IF I>8 THEN 2640
2622 IF J<1 THEN 2640
2623 IF J>8 THEN 2640
2630 IF Q(I,J)=4 THEN 2670
2640 NEXT J
2650 NEXT I
2660 GOTO 2730
2670 LET C$="DOCKED"
2680 LET E=3000
2690 LET P=15
2700 MAT D=ZER
2710 LET S=0
2720 GOTO 2810
2730  IF K3>0 THEN 2780
2740 IF K3>0 THEN 2780
2750 IF E<300 THEN 2870
2760  LET C$="GREEN"
2770 GOTO 2810
2780 LET C$="*RED*"
2790 GOTO 2810
2800 LET C$="YELLOW"
2810  LET Z=0
2820 LET Z=0
2830 FOR F3=1 TO 8
2835 PRINT"!";
2840 GOSUB 3330
2845 PRINT  "!"
2860 NEXT F3
2880PRINT"STARDATE";T;"CONDITION ";C$
2890PRINT"ENERGY   ";E;TAB(15);"TORPEDOES";P
2900PRINT"SHIELDS ";S;TAB(15);"KLINGONS ";K9
3000 RETURN
3010PRINT"COMPUTER ACTIVE-COMMAND";
3020 LET J5=1
3021 GOSUB 5500
3022 IF L4=100 THEN 3020
3023 LET A=L3
3030 ON A+1 GOTO 2280,3100,3310
3040 PRINT"COMPUTER FUNCTIONS AVAILABLE"
3050 PRINT"    0=DAMAGE REPORT"
3060 PRINT"    1=PHOTON TORPEDO DATA"
3070 PRINT"    2=SHORT RANGE SCAN"
3080 PRINT
3090 GOTO 3010
3100 PRINT
3110 FOR  I= 1 TO 3
3115 IF K3<1 THEN 2350
3120 IF K(I,3)<=0 THEN 3200
3130 LET X=K(I,2)-S2
3140 LET Y=S1-K(I,1)
3150 IF  X=0 THEN 3240
3160 LET A=INT(((57.3*ATN(Y/X))/45+1)*100)/100
3170 IF X>0 THEN 3172
3171  GOTO 3182
3172 IF Y<0 THEN 3290
3180 IF X<0 THEN 3220
3190 PRINT"DIRECTIONS=";A
3200 NEXT I
3210  GOTO 700
3220 LET A=A+4
3230 GOTO 3190
3240 IF Y<0 THEN 3270
3250 LET A=3
3260 GOTO 3190
3270 LET A=7
3280 GOTO 3190
3290 LET A=A+8
3300 GOTO 3190
3310 GOSUB 2600
3320  GOTO 700
3330 REM *****OUTPUT QUADRANT*****
3340 LET Z=Z+1
3350  FOR I=1 TO 8
3360 LET Z$="    <*>+>+ * >!<"
```

```
3370 PRINT Z$(O(Z,I)*3,O(Z,I)*3+2);
3380 NEXT I
3390 IF Z=1 THEN  3410
3391 IF Z=8 THEN 3410
3410 RETURN
3420 REM*****PRINTS DEVICE NAME*****
3430  RESTORE
3440 DATA"WARP ENGINES","SCANNERS","PHASER BANKS","TORPEDO TUBES"
3450 DATA"SHIELD CTRL","COMPUTER"
3460 FOR X= 1 TO R1
3470 READ Z$
3480 NEXT X
3490 RETURN
3500 REM****PLACEMENT IN QUADRANT ARRAY****
3510 LET R1=FNA(8)
3520 LET R2=FNA(8)
3530 IF O(R1,R2)<>0 THEN 3510
3540 RETURN
3550 PRINT
3551PRINT"YOUR RESIGNATION IS ACCEPTED"
3560 GOTO 6400
3565 PRINT"SELECT TOPOLOGY:0=PLANAR"
3566 PRINT"                1=CYLINDRICAL"
3567 PRINT"                2=TOROIDAL"
3568 INPUT T2
3569 GOTO 700
3570 PRINT" DO YOU NEED INSTRUCTIONS";
3580 INPUT A$
3590 PRINT
3591 PRINT
3592 PRINT
3593 PRINT
3594 PRINT
3600 IF A$(0,0)<>"Y" THEN 440
3610 PRINT TAB(5);"<*>=SHIP 0 OR SHIP 1"
3620 PRINT TAB(5);" * =STAR"
3630 PRINT TAB(5);")+(=KLINGON"
3640 PRINT TAB(5);">!<=STARBASE"
3650 PRINT
3651 PRINT
3660 PRINT"COMMAND 0=WARP ENGINES"
3670 PRINT"COURSE IS IN A CIRCULAR VECTOR AS SHOWN.";TAB(50);"4  3  2"
3680PRINT"REAL VALUES MAY BE USED.FOR EXAMPLE,";TAB(51);"\  !  /"
3690 PRINT"1.5 WOULD BE HALFWAY BETWEEN 1 AND 2.";TAB(52);"-!-"
3700 PRINT TAB(48);"5 -------- 1"
3710PRINT"A 'WARP FACTOR' IS THE SIZE OF ONE QUADRANT.";TAB(52);"/!\"
3720PRINT TAB(51);"6  7  8"
3730 PRINT TAB(50);"/  !  \"
3740 PRINT"COMMAND 1=LONG RANGE SCAN"
3750 PRINT"CODED IN A 3 BY 3 FORM WITH THE CURRENT QUADRANT"
3760 PRINT" AT THE CENTRE."
3770 PRINT"  K=NO. OF KLINGONS. B=NO. OF BASES.  S= NO. OF STARS"
3780 PRINT
3781 PRINT
3782 PRINT"COMMAND 2=PHASERS"
3790 PRINT"YOU MAY DESTROY THE KLINGONS BY USING ENOUGH PHASER"
3800 PRINT"POWER AS TO DEPLETE HIS SHIELDS. KEEP IN MIND THAT WHEN"
3810 PRINT"YOU FIRE AT HIM ,HE GONNA DO IT TO YOU, TOO!"
3820 PRINT
3821 PRINT
3822 PRINT"COMMAND 3=PHOTON TORPEDOES"
3830 PRINT"COURSE IS SAME AS WITH WARP ENGINES. THE LIBRARY"
3840 PRINT"COMPUTER CAN COMPUTE TRAJECTORY FOR YOU (OPTION 1)"
3850 PRINT
3851 PRINT
3852 PRINT"COMMAND 4=SHIELDS"
3860 PRINT"DEFINES THE AMOUNT OF ENERGY TO BE ASSIGNED TO SHIELDS."
3870 PRINT
3871 PRINT
3872 PRINT"COMMAND 5=LIBRARY COMPUTER"
3880PRINT"   OPTION 0=DAMAGE REPORT"
3890 PRINT"  A STATE OF REPAIR LESS THAN ZERO INDICATES THAT"
3900 PRINT"  THAT DEVICE IS TEMPORARILY DISABLED."
3910 PRINT"   OPTION 1=PHOTON TORPEDO DATA"
3920 PRINT"  GIVES DIRECTION TO ALL KLINGONS IN YOUR QUADRANT"
3930 PRINT"   OPTION 2=SHORT RANGE SCAN"
3940 PRINT"  ALSO GIVEN AUTOMATICALLY AFTER SUCCESSFUL COMPLETION"
3950 PRINT"  OF WARP ENGINE MANEUVERS."
3960 PRINT
3961 PRINT
3962 PRINT"COMMAND 6=RESIGNATION"
3965 PRINT
3966 PRINT
3970 PRINT"COMMAND 7=CHANGE TOPOLOGY"
3971 PRINT"0 WILL ESTABLISH A PLANAR TOPOLOGY;1,CYLINDRICAL;2,TOROIDAL."
3972 PRINT
3973 PRINT
3974 PRINT"COMMAND 8=CHANGE SHIP"
3975 PRINT"EXECUTION OF THIS COMMAND WILL CAUSE A SHORT RANGE SCAN"
3976 PRINT"OUTPUT IF THE SHIPS ARE IN DIFFERENT SECTORS"
3977 FOR I= 1 TO 6
3978 PRINT
3979 NEXT I
3980 GOTO440
4000 ON T2+1 GOTO 4010,4075,4150
4010 IF I=0 THEN 4060
4020 IF J=0 THEN 4060
4030 IF I=9 THEN 4060
4040 IF J=9 THEN 4060
4050  GOTO 4070
4060 LET N(09)=0
4070 RETURN
4075 IF J=0 THEN 4078
4076 IF J=9 THEN 4078
4077  GOTO 4080
4078 LET N(09)=0
4080IF I=0 THEN 4110
4090 IF I=9 THEN 4130
4100 GOTO 4140
4110 LET B6=8
4120 GOTO 4140
4130 LET B6=1
4140 RETURN
4150 IF J=0 THEN 4180
4160 IF J=9 THEN 4200
4170 GOTO 4210
4180 LET B5=8
```

```
4190 GOTO 4210
4200 LET B5=1
4210 GOTO 4080
4300 ON T2+1 GOTO 4310, 4320,4330
4310 RETURN
4320 IF Q1<1 THEN 4340
4330 IF Q1>8 THEN 4360
4335  GOTO 4370
4340 LET Q1=8+Q1
4350 GOTO 4370
4360 LET Q1=Q1-8*INT(Q1/8)
4370 RETURN
4380 IFQ2<1 THEN 4400
4390 IF Q2>8 THEN 4450
4395 GOTO 4320
4400 LET Q2=8+Q2
4440 GOTO 4320
4450 LET Q2=Q2-8*INT(Q2/8)
4460 GOTO 4320
4500 GOTO 6400
4510 LET V(B,0)=S1
4511 LET E4=S1
4512 LET E5=S2
4520 LET V(B,1)=S2
4530 LET V(B,2)=Q1
4540 LET V(B,3)=Q2
4550 LET V(B,4)=E
4560 LET V(B,5)=P
4570 LET V(B,6)=S
4580 LET V(B,7)=D(0)
4590 LET V(B,8)=D(1)
4600 LET V(B,9)=D(2)
4610 LET V(B,10)=D(3)
4620 LET V(B,11)=D(4)
4630 LET V(B,12)=D(5)
4640 LET B=1-B
4650 LET S1=V(B,0)
4660 LET S2=V(B,1)
4670 LET Q1=V(B,2)
4680 LET Q2=V(B,3)
4690 LET E=V(B,4)
4700 LET P=V(B,5)
4710 LET S=V(B,6)
4720 LET D(0)=V(B,7)
4730 LET D(1)=V(B,8)
4740 LET D(2)=V(B,9)
4750 LET D(3)=V(B,10)
4760 LET D(4)=V(B,11)
4770 LET D(5)=V(B,12)
4780 RETURN
5000 GOSUB 4510
5010 PRINT
5014 LET E3=1
5015 IF B=0 THEN 5018
5016 CALL(8,1)
5017 GOTO 5020
5018 CALL(8,-1)
5020 IF V(1,2)=V(0,2) THEN 5022
5021 GOTO 5025
5022 IF V(1,3)=V(0,3) THEN 5030
5025 GOTO 360
5030 LET Q(S1,S2)=1
5035 LET Q(E4,E5)=1
5036 LET E3=2
5037 GOTO 700
5250 FOR I= 1 TO 3
5251 IF K3<1 THEN 5411
5252 LET Q(K(I,1),K(I,2))=0
5253 NEXT I
5260 LET K(1,1)=K(1,1)-1
5265 LET K(1,2)=K(1,2)+1
5270 LET K(2,1)=K(2,1)
5272 LET K(2,2)=K(2,2)+1
5274 LET K(3,1)=K(3,1)+1
5276 LET K(3,2)=K(3,2)+1
5280 FOR I= 1 TO 3
5285 FOR J=1 TO 2
5290 IF K(I,J)>8 THEN 5294
5292 IF K(I,J)<1 THEN 5296
5293 GOTO 5300
5294 LET K(I,J)=1
5295 GOTO 5300
5296 LET K(I,J)=8
5300 NEXT J
5310 NEXT I
5320 FOR I= 1 TO 3
5325 IF K(I,3)=0 THEN 5400
5330 LET Q(K(1,1),K(I,2))=2
5340 IF RND(0)<1/3 THEN 5360
5350 GOTO 5400
5360 IF K(I,3)=0 THEN 5400
5370 LET H=INT(K(I,3)/RND(0)+1)
5375 IF H>20! THEN 5400
5380 LET E=E-H
5390 PRINT H;"UNIT HIT ON SHIP ";ES(B,B)
5400 NEXT I
5401 FOR I=1 TO S3
5402 LET E6=S(I,1)
5403 LET E7=S(I,2)
5404  LET Q(E6,E7)=3
5405 NEXT I
5406 IF B3=0 THEN 5408
5407  LET Q(E1,E2)=4
5408 IF E3=1 THEN 5410
5409 LET Q(E4,E5)=1
5410 LET Q(S1,S2)=1
5411 RETURN
5500 LET L1=L2=L3=L4=0
5510 LET B$="          "
5515 LET B$=B$(0,J5)
5520 INPUT B$
5530 FOR I=0 TO J5
5540 FOR J=0 TO 9
5550 IF B$(I,I)=S$(J,J) THEN 5580
5560 IF B$(I,I)="." THEN 5600
5570 GOTO 5620
5580 LET L3=10*L3+J
5590 GOTO 5630
5600 LET L2=1
5610 LET L1=1
5620 NEXT J
5630 NEXT I
```

```
5640 IF L3=0 THEN 5660
5650 GOTO 5680
5660 IF B$(0,0)<>"0" THEN 5720
5680 IF L1=1 THEN 5700
5690 RETURN
5700 LET L3=10*L3/(10^(LEN(B$)-L2))
5710 GOTO 5740
5720 LET L4=100
5730 PRINT "ERROR"
5740 RETURN
5800 LET M1=B
5810 IF M1=1-B THEN 5850
5820 LET M2=0
5830 LET T=T+1
5840 RETURN
5850 LET M2=M2+1
5860 IF M2>2 THEN 5880
5870 RETURN
5880 LET T=T+1
5890 RETURN
6000 LET I=T-T0
6010 LET P(I,1,B)=P
6020 LET P(I,2,B)=E
6030 LET P(I,3,B)=K9
6040 LET P(I,4,B)=B3
6050 LET P(I,5,B)=Q1
6060 LET P(I,6,B)=Q2
6070 LET P(I,7,B)=S1
6080 LET P(I,8,B)=S2
6090 RETURN
6400 IF J1=0 THEN 6420
6410 GOTO  6450
6420 PRINT"ONE SHIP LEFT"
6430 LET J1=1
6435 GOSUB 4510
6440 IF B=0 THEN 6443
6441  CALL(9,1)
6442 GOTO 360
6443 CALL(9,-1)
6444 GOTO 360
6450 PRINT"LAST SHIP GONE"
6460 PRINT"FOR DISC COPY OF SHIPS' BEHAVIOUR KEY Y"
6470 INPUT D$
6480 IF D$(0,0)<>"Y" THEN 6620
6490 CALL(1,1)
6500 FOR B=0 TO 1
6510 FOR J=0 TO 30
6520 FOR I=1 TO 9
6530 PRINT P(J,I,B);
6540 NEXT I
6545 PRINT
6550 NEXT J
6560 NEXT B
6570 CALL(1,-1)
6580 CALL(1,0)
6590 PRINT"LAST SHIP GONE"
6600 PRINT"TO ORTAIN HARDCOPY SWITCH TO TTY AND RUN REC"
6610  PRINT"     TYPE RUN TO GO AGAIN"
6620 END
```

Appendix 3

The Variation of Doubt about topics as concepts for them are learned

Appendix 3

Some experiments, have been performed to investigate increase of certainty or the decrease in doubt about a topic and the variation in the kind or quality of doubt. The experiments formed part of ongoing studies of "learning style" and "learning to learn" carried out over a mixed, young adult, late adolescent, senior school and technical-or-teacher-training-college, population.

The design of the study was modified to include whenever time allowed, one or both of the following procedures.

(a) Present a set of 8 questions on topics in mathematics and set theory or logic, and request an answer to be selected in the least time possible (not more than 2½ minutes per question is imposed as a limit). The approximate response latency of each subject in answering each question is recorded. After answering a question subjects are asked to report any rule or method they have employed, ie. to say how or why their response was selected (this may be, and quite often is, a means of approximation allowing some of the response alternatives to be excluded). After stating a rule (there is no statement if no rule whatever can be elicited), subjects state their confidence in the rule on a scale from "the best rule I know " to "there are so many rules I know" and are allowed to adjust rankings after the 8 questions have been dealt with . Finally, after some interpolated activity (the study in which this investigation is embedded), subjects are presented with the topic headings, the rules they asserted (a kind of cued recall) and are required to rank the topics as more or less "familiar/ long learned" or more or less

"unfamiliar/recently learned" . A further category "never heard of it" is permitted if no "rule statement" of any kind has been elicited during the course of question answering or if the subjects are able to argue that they used an irrelevant-to-the topic answering method (for example, exclusion of alternatives based on expectations of position priority or some other examination technique, applicable to any subject matter).

(b) The procedure described in (a) except that questions are general or linguistic (English, subjects are all habitual English speakers).

Typical questions from set (a) and set (b) are shown below.

It is argued that the selective response latency (more properly, a logarithmic function of this latency) is indicative of doubt about an outcome. This contention is empirically supported by data from 32 subjects who, after the experiment, rated their confidence in their own answers . Under these conditions subjects are more certain they are correct (which is not the same as being correct) for relatively rapid responses. Next, it is argued that the confidence estimate obtained in the course of the experiment indicates doubt about the method used. Subjects agree that it does so and also agree that they may be doubtful because they have to reconstruct a method on the basis of an overlearned skill (for example, of addition, of saying what the subject of a sentence is), or because they have only recently constructed a rule and are not sure that it will work.

"Select the most plausible subject of the sentence:

'At night we were not so certain about the friendliness of our new house' is:

(a) The house, or

(b) We ; or

(c) Friendliness , or

(d) Night "

"Select the most plausible subject of the sentence:

'At night we were not so certain about the friendliness of our new house' is:

(a) The house, or

(b) We ; or

(c) Friendliness , or

(d) Night "

Appendix 4

Statistical Data from a Comparative Study of 2 Tests for Learning Style and other tests and Inventories used as Test Instruments Amongst Mixed Ability 16-18 year old students in 8 different classes, and 6 different school, in South East England. Edited Extracts from a Research Memorandum issued under SSRC Research Programme HR 2708/2.

Statistical Data

There are four experimental sessions, each of approximately 2½ hours. The design is shown below: experimental subgroups being fairly balanced, at the outset (n = 127 students).

Session	1	2	3	4
Group A	Spies Test	Test Battery + ILP	Smugglers Test	Progressive Matrices + Inventory
Group B	Smugglers Test	Test Battery + ILP	Spies Test	Progressive Matrices + Inventory

It should be noted that the correlations appearing in the following tables are standard, product-moment correlations as the sample sizes justify the use of a parametric index, and are thus only comparable with rank-correlation figures in relative terms, ie. patterns of correlation values.

The varying numbers of subjects in different samples is due to the fact that some people failed to turn up for one or more sessions, other than the first session.

(a) Illinois Learning Profile (an inventory with the following identifiable scores)

SA = Synthesis Analysis
SM = Study Methods
FR = Fact Retention
EP = Elaborative Processing

(b) The Lancaster Study Method and Learning Inventory has 15 scores, in the form current when the data was obtained. Scales 1 to 15 are invariably coded in data files by numbers 42 to 56 and some naming prefix such as B, or BM, or BL. These scales are not named since the inventory is being developed and the precise interpretation is still uncertain.

(c) Test Battery

AH5I = Alice Heim 5 Intelligence Test (Part I)
AH5II = " " " " (Part II)
AH5T = " " " " Totals
Anal = Analogical Reasoning
Circ = Circles Test
Figs = Hidden Figures Test

(d) Progressive Matrices
(Advanced Raven Matrices) are scores for number attempted, number correct, and for correct percentage.

(e) Learning Styles Tests (Either "Spy Ring History Test" or "Smugglers Test")

N = Neutral Score
O = Operation Learning Score (Procedure Building)
C = Comprehension Learning Score (Description Building)
V = Versatility (Extrapolated or Predicted) score

The O, C and V scores are derived from the following subscores.

U = Rule content
T = Rote recall
S = Interpretation (unreliable in its present form due, probably, to a defect in the scoring method)
X = Pattern
Y = Global regularity

(f) Academic Achievement Score

Rating is based upon the examination grading of students as follows :

"O" level grade	A	B	C	D	E	-	-	-	-	-	
GCE grade	-	-	-	-	I	II	III	IV	V	VI	
Achievement Score	10	9	8	7	6	5	4	3	2	1	

(g) B, BT, BM, etc, internal references for disc storage.

File names are cited since, if other investigators are anxious to access the original data, as it is recorded, they can do so directly.

(h) A few other files are available, but are not mentioned in this manuscript; for example, "schools of students" or "performance record" or age or sex of student.

1st test (Smugglers or Spies) of those who did a 2nd Test (n = 76)

2nd Test (Smugglers or Spies) (n = 76)		N	O	C	V	U	T	X	Y	S
		B10	B11	B12	B13	B14	B15	B16	B17	B18
N	B10	0.160 -0.211	0.282 9.805	0.368 5.796	0.344 14.498	0.301 9.571	0.202 7.393	0.332 7.367	0.305 2.317	0.104 18.660
O	B11	0.011 -6.621	0.532 4.453	0.351 -1.183	0.416 9.468	0.379 3.411	0.541 3.449	0.323 1.249	0.271 -4.258	0.149 14.403
C	B12	0.146 -3.947	0.271 7.852	0.366 2.919	0.281 12.381	0.212 7.157	0.222 5.576	0.325 4.941	0.331 -0.877	0.195 19.591
V	B13	0.154 -12.608	0.436 -3.189	0.530 -8.905	0.592 3.637	0.369 -3.469	0.376 -2.803	0.473 -5.276	0.464 -11.562	0.073 7.714
U	B14	0.167 -8.105	0.393 3.193	0.223 -1.800	0.476 9.340	0.399 2.738	0.282 2.363	0.173 0.539	0.208 -4.823	0.281 15.237
T	B15	-0.124 -3.965	0.464 3.830	0.338 -0.124	0.224 7.266	0.234 2.971	0.566 3.929	0.338 1.694	0.231 -2.470	-0.008 10.766
X	B16	0.178 -5.246	0.215 5.174	0.336 0.797	0.233 9.806	0.172 4.659	0.179 4.002	0.308 2.951	0.292 -2.439	0.162 15.957
Y	B17	0.071 -1.324	0.294 10.726	0.296 5.459	0.249 14.379	0.209 9.778	0.251 7.468	0.258 7.057	0.270 1.613	0.137 21.494
S	B18	0.046 -17.423	0.131 -8.95	0.131 -12.605	0.021 -3.365	0.105 -9.195	0.121 -6.939	0.221 -10.518	-0.027 -13.616	-0.012 0.910

Table 1. 1st/2nd correlations and "t" values (correlations in top part of box "t" values in lower part of box)

Spies (those who did 2 tests)

Smugglers (those who did 2 tests)

		N	O	C	V	U	T	X	Y	S
		BF1	BF2	BF3	BF4	BF5	BF6	BF7	BF8	BF9
N	BE1	0.262 -3.60	0.315 6.467	0.376 4.948	0.369 12.12	0.428 7.112	0.118 4.468	0.229 6.472	0.364 0.789	0.136 13.488
O	BE2	0.074 -9.820	0.506 -0.18	0.195 -1.647	0.376 6.099	0.295 -0.227	0.503 -0.024	0.128 0.567	0.205 -5.423	0.101 8.359
C	BE3	0.017 -5.115	0.322 6.674	0.398 4.76	0.381 12.751	0.199 6.277	0.313 4.589	0.385 7.265	0.372 -0.228	0.164 14.748
V	BE4	0.194 -15.188	0.401 -6.363	0.372 -7.650	0.532 4.76	0.326 -6.176	0.324 -4.614	0.139 -4.952	0.381 -11.61	0.082 3.249
U	BE5	0.126 -10.954	0.489 -0.751	0.169 -2.094	0.407 5.938	0.419 0.18	0.379 -0.391	0.038 0.174	0.226 -6.099	0.179 8.547
T	BE6	0.024 -6.415	0.395 0.544	0.160 -0.655	0.237 4.940	0.109 0.424	0.490 -0.80	0.182 1.024	0.111 -3.376	-0.005 6.827
X	BE7	0.139 -5.830	0.294 4.468	0.369 2.851	0.362 10.421	0.229 4.308	0.245 3.302	0.378 0.61	0.331 -1.438	0.109 12.490
Y	BE8	-0.175 -2.826	0.219 8.079	0.277 6.233	0.225 13.129	0.050 7.496	0.283 5.879	0.247 8.349	0.266 5.29	0.065 15.391
S	BE9	0.075 -26.610	0.176 -15.982	0.064 -15.954	0.009 -7.787	0.206 -16.721	0.099 -11.265	-0.023 -12.71	0.060 -19.402	0.029 -4.36

(n = 76)

Table 2 Spies/Smugglers correlations for all subjects who did both tests

Correlation in top of cell "t" value at bottom of cell.

		N B1	O B2	C B3	V B4	U B5	T B6	X B7	Y B8	S B9
N	B1	-	0.160	0.078	0.289	0.195	0.091	0.127	-0.017	-0.011
O	B2	-	-	0.497	0.670	0.789	0.827	0.525	0.377	0.048
C	B3	-	-	-	0.552	0.384	0.450	0.915	0.814	-0.075
V	B4	-	-	-	-	0.636	0.501	0.561	0.465	0.068
U	B5	-	-	-	-	-	0.379	0.375	0.313	0.189
T	B6	-	-	-	-	-	-	0.507	0.310	-0.083
X	B7	-	-	-	-	-	-	-	0.611	-0.129
Y	B8	-	-	-	-	-	-	-	-	-0.029
S	B9	-	-	-	-	-	-	-	-	-

	N B1	O B2	C B3	V B4	U B5	T B6	X B7	Y B8	S B9
Means	74.02	51.83	60.83	34.02	51.05	52.25	55.27	69.21	22.45
SDs	18.07	18.65	19.21	22.47	18.02	28.87	22.28	19.45	19.56

Table 3 Cross score correlations for all (n = 127) subjects at 1st trial whether Spies test or Smugglers test.

		N B19	O B20	C B21	V B22	U B23	T B24	X B25	Y B26	S B27
N	B19	-	0.131	0.159	0.279	0.229	-0.005	0.182	0.028	0.082
O	B20	-	-	0.558	0.578	0.793	0.828	0.502	0.469	-0.034
C	B21	-	-	-	0.564	0.378	0.554	0.925	0.813	-0.172
V	B22	-	-	-	-	0.547	0.450	0.509	0.467	0.002
U	B23	-	-	-	-	-	0.372	0.325	0.350	0.134
T	B24	-	-	-	-	-	-	0.526	0.420	-0.156
X	B25	-	-	-	-	-	-	-	0.541	-0.162
Y	B26	-	-	-	-	-	-	-	-	-0.159
S	B27	-	-	-	-	-	-	-	-	-

	N B19	O B20	C B21	V B22	U B23	T B24	X B25	Y B26	S B27
Means	77.53	51.91	63.05	36.79	59.95	51.20	57.22	70.95	21.63
SDs	15-23	17.52	17.56	22.43	17.32	27.55	20.82	18.87	19.05

Table 4 Cross score correlations on 1st test (Smugglers or Spies) for all n = 76 subjects who did both 1st and 2nd trials.

		N	O	C	V	U	T	X	Y	S
		BC1	BC2	BC3	BC4	BC5	BC6	BC7	BC8	BC9
N	BC1	-	0.289	0.138	0.305	0.306	0.197	0.176	0.059	-0.009
O	BC2	-	-	0.556	0.759	0.789	0.837	0.563	0.487	0.175
C	BC3	-	-	-	0.576	0.426	0.496	0.914	0.849	0.002
V	BC4	-	-	-	-	0.715	0.539	0.548	0.593	0.178
U	BC5	-	-	-	-	-	0.344	0.389	0.402	0.259
T	BC6	-	-	-	-	-	-	0.543	0.394	0.098
X	BC7	-	-	-	-	-	-	-	0.682	-0.049
Y	BC8	-	-	-	-	-	-	-	-	0.016
S	BC9	-	-	-	-	-	-	-	-	-

	N BC1	O BC2	C BC3	V BC4	U BC5	T BC6	X BC7	Y BC8	S BC9
Means	78.04	52.99	59.25	35.92	52.77	52.74	52.38	69.47	29.43
SDs	17.16	18.31	18.82	22.35	17.99	28.56	21	19.12	21.46

Table 5 Cross score correlations for all (n = 109) subjects who did Smugglers test either on 1st or 2nd trial.

	N	O	C	V	U	T	X	Y	S
	BD1	BD2	BD3	BD4	BD5	BD6	BD7	BD8	BD9
N	BD1	-	0.180	0.373	0.383	0.199	0.109	0.421	0.105	0.003
O	BD2	-	-	0.306	0.566	0.796	0.838	0.230	0.192	0.065
C	BD3	-	-	-	0.607	0.208	0.301	0.925	0.737	0.103
V	BD4	-	-	-	-	0.474	0.504	0.591	0.368	0.047
U	BD5	-	-	-	-	-	0.417	0.192	0.145	0.176
T	BD6	-	-	-	-	-	-	0.307	0.178	-0.001
X	BD7	-	-	-	-	-	-	-	0.441	0.130
Y	BD8	-	-	-	-	-	-	-	-	0.019
S	BD9	-	-	-	-	-	-	-	-	-

	N BD1	O BD2	C BD3	V BD4	U BD5	T BD6	X BD7	Y BD8	S BD9
Means	71.74	57.40	69.29	40.48	55.24	60.11	66.40	73.28	16.18
SDs	19.81	18.37	14.67	21.25	17.34	28.27	18.58	15.13	17.10

Table 6 Cross score correlations for all (n = 94) subjects who did Spies test either on 1st or 2nd trial.

		N	O	C	V	U	T	X	Y	S
		BA19	BA20	BA21	BA22	BA23	BA24	BA25	BA26	BA27
N	BA10	0.209	0.338	0.490	0.339	0.363	0.191	0.239	0.379	0.172
O	BA11	-0.029	537	0.262	0.366	0.288	0.566	0.208	0.205	0.080
C	BA12	-0.075	0.358	0.521	0.307	0.200	0.367	0.540	0.430	0.272
V	BA13	0.031	0.486	0.507	0.525	0.327	0.456	0.467	0.459	0.059
U	BA14	0.042	0.534	0.216	0.444	0.433	0.429	0.045	0.247	0.200
T	BA15	-0.090	0.373	0.217	0.185	0.074	0.508	0.287	0.104	-0.052
X	BA16	0.044	0.307	0.482	0.288	0.183	0.301	0.531	0.387	0.245
Y	BA17	-0.234	0.284	0.375	0.173	0.145	0.310	0.344	0.324	0.128
S	BA18	0.144	0.151	0.060	0.010	0.105	0.141	-0.033	-0.01	0.164

Table 7. Correlations between 1st test and 2nd test for n = 42 subjects, Smugglers 1st and Spies 2nd.

	N BA19	O BA20	C BA21	V BA22	U BA23	T BA24	X BA25	Y BA26	S BA27
Means	80.43	51	56.5	36.43	53.29	47.71	50.02	68.60	25.38
SDs	14.08	17.43	20.27	22.42	17.61	27.33	20.96	21.03	19.84

Smugglers Test (1st)

	N BA10	O BA11	C BA12	V BA13	U BA14	T BA15	X BA16	Y BA17	S BA18
Means	72.38	57.62	71.43	43.69	53.57	59.02	68.43	75.43	15.52
SDs	22.75	19.01	13.45	20.14	18.35	29.27	18.34	12.27	16.75

Spies Test (2nd)

Means and SDs for Order of testing for sample of subjects

		N	O	C	V	U	T	X	Y	S
		BB19	BB20	BB21	BB22	BB23	BB24	BB25	BB26	BB27
N	BB10	0.366	0.234	0.161	0.419	0.268	0.190	0.285	-0.108	-0.017
O	BB11	0.315	0.666	0.447	0.529	0.633	0.556	0.419	0.261	0.205
C	BB12	0.287	0.160	0.312	0.334	0.172	0.092	0.267	0.247	0.044
V	BB12	0.451	0.468	0.582	0.676	0.435	0.353	0.545	0.348	-0.02
U	BB14	0.617	0.403	0.291	0.478	0.509	0.204	0.391	-0.025	0.359
T	BB15	-0.030	0.573	0.379	0.340	0.456	0.573	0.269	0.362	0.019
X	BB16	0.214	0.067	0.251	0.255	0.099	0.040	0.218	0.211	-0.046
Y	BB17	0.328	0.253	0.334	0.362	0.238	0.145	0.278	0.249	0.166
S	BB18	0.134	-0.021	-0.009	0.062	0.116	-0.149	0.107	-0.153	0.125

Table 8. Correlations between 1st test and 2nd test for n = 34 subjects. Spies 1st and Smugglers 2nd.

	N BB10	O BB11	C BB12	V B B13	U BB14	T BB15	X BB16	Y BB17	S BB18
Means	82.65	63.82	66	46.03	61.35	67.18	60.53	73.59	36.06
SDs	12.94	13.12	13.13	18.43	12.62	23.78	15.42	13.78	23.30

Spies Test (1st)

	N BB19	O BB20	C BB21	V BB22	U BB23	T BB24	X BB25	Y BB26	S BB27
Means	73.26	54.79	69.00	38.00	53.59	57.65	66.06	73.62	17.26
SDs	15.95	18.48	13.37	23.11	16.82	28.00	17.95	15.73	18.68

Smugglers Test (2nd)

Means and SDs for Order of Testing for Sample of Subjects

	N	O	C	V	U	T	X	Y	S
	B1		B3	B4	B5	B6	B7	B8	B9
Corr B41	0.416	0.243	0.186	0.402	0.301	0.137	0.241	0.079	0.041

(a)

Corr	BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9
BT41	0.383	0.271	0.182	0.478	0.331	0.151	0.241	0.082	0.082

(b)

Corr	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8	BL9
BL41	0.405	0.139	0.134	0.395	0.258	0.032	0.184	0.073	0.072

(c)

Corr	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	BM9
BM1	0.449	0.177	0.162	0.368	0.225	0.118	0.244	0.043	-0.014

(d)

Table 9 Correlations between level of academic achievement and scores on the 1st stylistic test

(a) all subject n = 127
(b) subjects who also did test battery n = 104
(c) subjects who also did Lancaster Inventory n = 86
(d) Subjects who also did Progressive Matrices n = 79

	BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9
Means	75.173	52.808	63.067	86.663	52.606	52.990	58.009	71.125	21.663
SDs	17.509	18.779	18.546	22.504	18.068	29.353	21.247	18.784	19.607

		SA	SM	FR	EP	AH5I	AH5II	AH5T	Anal	Figs	Cir. Test
	Corr	B28	B29	BT30	BT31	BT32	BT33	B34	B35	B36	B37
N	BT1	0.158	-0.193	0.119	0.097	0.277	0.247	0.298	0.260	0.137	-0.043
O	BT2	0.096	-0.0004	0.155	-0.137	0.307	0.337	0.365	0.219	0.211	0.175
C	BT3	0.093	0.110	-0.009	-0.014	0.291	0.290	0.328	0.315	0.307	0.273
V	BT4	0.128	-0.079	0.099	-0.249	0.504	0.461	0.549	0.519	0.226	0.179
U	BT5	0.191	-0.092	0.203	-0.183	0.286	0.344	0.412	0.276	0.179	0.037
T	BT6	0.046	0.084	0.066	-0.063	0.193	0.282	0.267	0.116	0.226	0.205
X	BT7	0.065	0.058	-0.008	-0.016	0.335	0.312	0.365	0.388	0.268	0.222
Y	BT8	0.049	0.131	0.079	-0.089	0.183	0.146	0.187	0.098	0.219	0.208
S	BT9	0.134	0.116	-0.069	-0.109	0.038	-0.018	0.013	-0.179	-0.016	-0.035

Table 10 Correlations between test battery scores and 1st stylistic scores n = 104

	N	O	C	V	U	T	X	Y	S
Corr	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	BM9
Correct	B38	0.101	0.451	0.208	0.443	0.452	0.349	0.423	0.215	-0.101
Attempts	B39	0.071	0.125	0.084	-0.051	0.006	0.211	0.133	-0.036	0.067
% Correct	B40	0.077	0.360	0.148	0.432	0.427	0.212	0.315	0.224	-0.052

	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	BM9
Means	76.924	51.405	60.481	36.595	52.405	50.468	56.582	70.797	23.494
SDs	15.815	18.648	17.398	22.893	17.838	28.777	20.679	18.533	20.695

Table 11 Correlation coefficients 1st stylistic test and advanced progressive matrices n = 79

	N	O	C	V	U	T	X	Y	S
Corr	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8	BL9
B42	-0.086	-0.028	-0.081	-0.077	0.021	-0.085	-0.121	-0.122	0.142
B43	0.076	-0.042	-0.092	-0.057	-0.151	0.047	-0.020	-0.188	0.155
B44	0.057	0.040	0.047	0.059	-0.012	0.041	0.029	-0.018	0.179
B45	-0.125	-0.047	-0.010	-0.059	-0.156	-0.052	-0.057	0.042	0.097
B46	0.030	-0.041	-0.085	-0.128	0.046	-0.119	-0.024	-0.192	0.159
B47	-0.186	0.047	-0.098	-0.175	0.023	-0.008	-0.123	-0.049	-0.065
B48	-0.143	0.043	-0.113	-0.172	-0.093	0.085	-0.193	0.003	-0.158
B49	-0.115	0.163	0.094	0.009	0.166	0.092	-0.0008	0.246	-0.005
B50	-0.039	0.199	0.060	0.041	0.097	0.178	0.021	0.072	-0.125
B51	0.047	0.257	0.326	0.309	0.126	0.216	0.397	0.106	0.102
B52	-0.293	0.027	0.171	0.071	-0.039	0.079	0.100	0.293	0.111
B53	-0.086	0.269	-0.0006	0.183	0.191	0.222	-0.029	0.121	0.069
B54	-0.083	-0.048	-0.167	-0.211	-0.162	0.018	-0.129	-0.138	-0.119
B55	0.051	-0.005	-0.164	-0.142	0.062	-0.054	-0.142	-0.202	0.200
B56	-0.102	-0.117	-0.081	-0.098	-0.034	-0.141	-0.161	0.042	-0.097

	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8	BL9
Means	76.569	54.555	64	38.512	54.244	55.372	59.058	72.256	22.651
SDs	16.046	18.344	18.133	22.167	17.095	29.407	20.981	18.372	20.101

Table 12 Correlations between 1st stylistic test scores and Lancaster Inventory

		SP	SM	FR	EP	AH5I	AH5II	AH5T	Anal	Figs	Cir. Test
	Corr	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37
N	B1	0.065	0.92	0.129	0.313	0.211	0.168	0.216	0.213	0.022	0.021
O	B2	0.072	0.076	0.137	-0.994	0.233	0.300	0.303	0.816	0.181	0.135
C	B3	0.109	0.067	-0.016	-0.089	0.339	0.339	0.386	0.314	0.325	0.345
V	B4	0.069	-0.059	0.092	-0.218	0.439	0.424	0.492	0.479	0.176	0.185
U	B5	0.228	0.003	0.177	-0.150	0.302	0.330	0.359	0.276	0.172	0.034
T	B6	-0.035	0.109	0.051	-0.047	0.157	0.239	0.224	0.091	0.169	0.202
X	B7	0.059	0.014	-0.056	-0.101	0.376	0.349	0.414	0.381	0.266	0.272
Y	B8	0.076	0.099	-.084	-0.176	0.220	0.178	0.228	0.219	0.240	0.278
S	B9	0.135	0.156	-0.147	-0.161	-0.033	-0.059	-0.052	-0.0247	-0.036	0.037

Table 13 Correlations between 1st stylistic test scores and test battery scores for subjects who also did the Lancaster Inventory .

	SA	SM	FR	EP	AH 5I	AH 5II	AH 5	Anal	Figs	Cir Test
Corr	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37
B28	-	-	-	-	-	-	-	-	-	-
B29	0.212	-	-	-	-	-	-	-	-	-
B30	0.053	-0.054	-	-	-	-	-	-	-	-
B31	0.007	0.092	-0.182	-	-	-	-	-	-	-
B32	0.301	-0.193	0.049	-0.052	-	-	-	-	-	-
B33	0.160	-0.122	-0.057	0.077	0.553	-	-	-	-	-
B34	0.264	-0.181	0.061	0.012	0.887	0.875	-	-	-	-
B35	0.093	-0.263	0.014	0.136	0.611	0.499	0.631	-	-	-
B36	0.044	0.118	-0.031	0.024	0.188	0.431	0.348	0.206	-	-
B37	0.107	0.279	-0.019	-0.085	0.241	0.105	0.198	0.142	0.081	-

	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37
Means	11.18	10.38	4.67	8.94	15.12	19.28	34.41	15.22	6.82	9.51
SDs	3.33	3.54	1.66	6.27	5.47	5.23	9.55	4.38	3.26	4.13

Table 14 Cross Correlations between all test battery scores. n = 104

		Means	SDs	Corr with BM41
SA	B28	11.183	3.332	0.283
SM	B29	10.379	3.549	0.136
FR	B30	4.068	1.665	0.010
EP	B31	8.942	6.263	0 105
AH5I	B32	15.125	5.480	0.695
AH5II	B33	19.279	5.235	0.518
AH5T	B34	34.413	9.449	0.689
Anal	B35	15.221	4.384	0.579
Figs	B36	6.817	3.271	0.194
Cir. Test	B37	9.509	4.128	0.308

Academic Achievement Mean = 59.971
SD = 25.104
n = 104

Table 15 Correlation between academic achievement and test battery.

	BM41	B38	B39	B40
Means	61.734	24.937	33.165	75.81
SDs	25.074	4.794	3.385	15.118
Corr BM41		0.425	-0.163	0.480

Academic Achievement | Correct | Attempt | % Correct

n = 79

Table 16 . Correlation between academic achievement and progressive matrices.

Appendix 5

Command Manual

Commander's Manual

1. Overall Description of the Mission and the Environment

You are employed as a mercenary in command of two spacecraft in order to protect the trade between four starbases. Starbase economy depends upon regular trade. Another mercenary, also in command of two spacecraft, has the same mission; to protect trade between the four starbases, named a, b, c, d (Figs 1, 2, 3 and 4)

A supervisor is in charge of professional conduct, once you engage in this mission and his organisation owns the spacecraft. The supervisor subscribes to the mission but strategy and tactics are up to you. For example, the supervisor cannot tell you how to act. He is an onlooker and overseer; not someone from whom you receive strategic or tactical instructions. He is your superior only insofar as a limited number of mandates must be accepted, unconditionally. These unquestioned mandates are as follows:

(a) If the supervisor interrogates you, then you must reply to his interrogation. During interrogation you are outside time- as though events were "frozen"

(b) If the supervisor calls you to a planning session, then you must attend and make plans and/or descriptions in a simple, but standard format. During planning, you are outside time- as though events were "frozen"

Fig 1. Starbase A

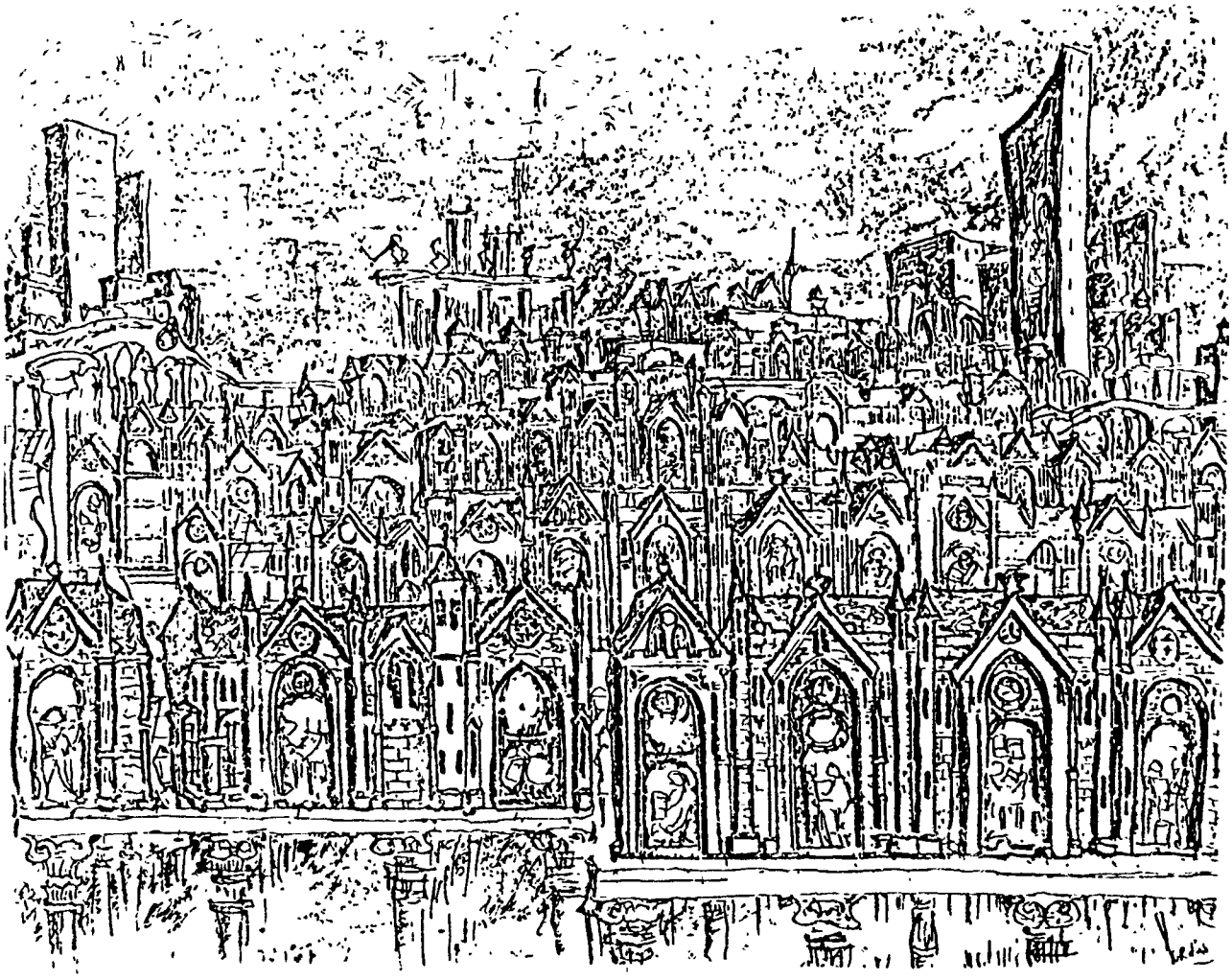


Fig 2. Starbase B

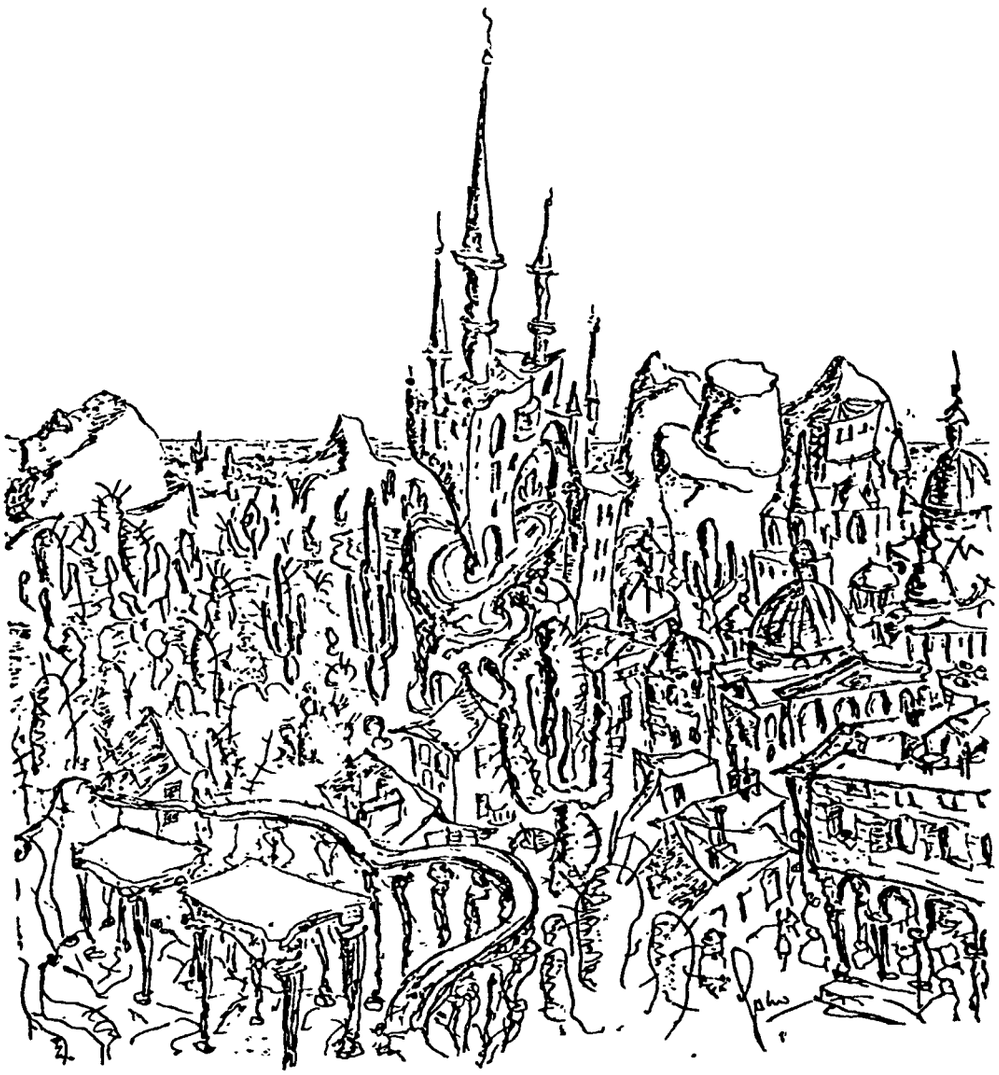


Fig 3. Starbase C

Fig 4. Starbase D

The supervisor is also responsible for advising you of emergencies which would render the mission impossible, supposing you have not anticipated them already (which, as a commander, you should be able to do). Emergencies will be signalled if any Starbase has a collapsing economy (its trade is insufficient for it to exist), or if any spacecraft runs out of the energy it needs to navigate and maintain its functions and is so located that it is in danger of being unable to obtain supplies of energy.

Energy, in a spacecraft, and money, in a starbase economy, are interchangeable.

You, as a mercentary, are employed by the starbases who will provide you with energy if you dock one or more of your spacecraft at one or more starbases. Conversely, you can offload spare energy from one or both of your spacecraft at one, any, or all, of the Starbases as an investment in real estate, which earns interest or loses its value according to the state of the starbase's economy (which depends upon the amount of uninterrupted trade it can maintain).

By this means, a judicious mercenary may gain credit during his term of duty and favouritism, for one or other Starbase, is not unknown. Surely, also, a mercenary can rightly expect to retain his investment and retrieve it on his next term of duty. However, investment is pointless unless the economy is kept going (the mission) and is pointless as an end

of its own . Without Spacecraft and mercenaries sufficient trade to keep the Starbase economy going is impossible; that is why you are employed, If any Starbase is in jeopardy (out of energy) or any Spacecraft is in jeopardy (out of energy) an emergency condition arises and can lead to the collapse of the entire trading system .

Emergencies, which are duly signalled , are as follows

(1) Emergency on Spacecraft
(2) Emergency on Starbases

In either case, things are out of control and you are liable to lose your investments (if any) . If the entire trading system collapses, you have failed in your task.

All the Starbases trade by exchanging commodities in freighters which, without interruption, would ply back and forth in a regular pattern of movement in space. The Starbases employ you as a mercenary because their trade routes are plagued by marauding entities called "Klingons", that appear in space and pirate the content of any freighters they encounter. Hence, part of your mission (to protect trade) is to eliminate the "Klingons", in particular, those which endanger trade, by means which will be detailed later (planting and exploding a mine in their vicinity). At this juncture it is sufficient to say that you can gain or

lose energy, from one or both of your spacecraft, in the course of eliminating "Klingons" The operation costs your spacecraft energy, some energy is gained if the operation is successful, and, finally, "Klingons" not on y influence trading barges but also spacecraft. They leach energy from any spacecraft in their vicinity. It is said that "Klingons" come out of an "inner space" and it has been conjectured that "Klingons" are manufactured by an avaricous and rational being which occupies "inner space" and lives off any "inhabitants" of space that are in motion, namely, trading freighters, and spacecraft.

A trading freighter, a spacecraft, a Klingon, and a mine, are shown in Figs 5, 6, 7.

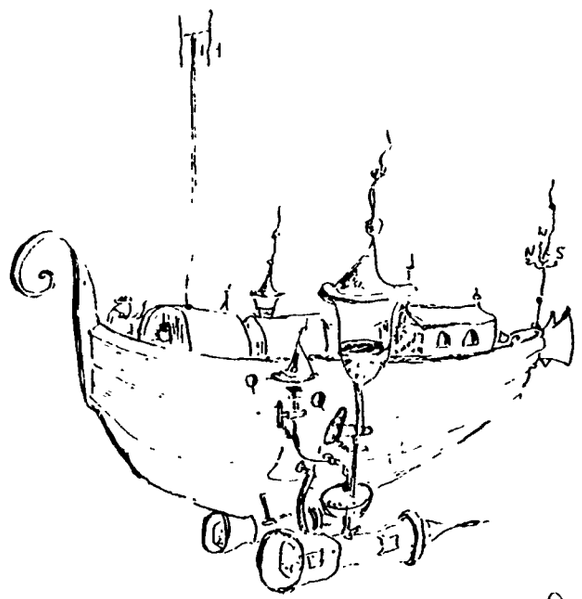


Fig 5: A Freighter, Symbolised by the sign "⟷"

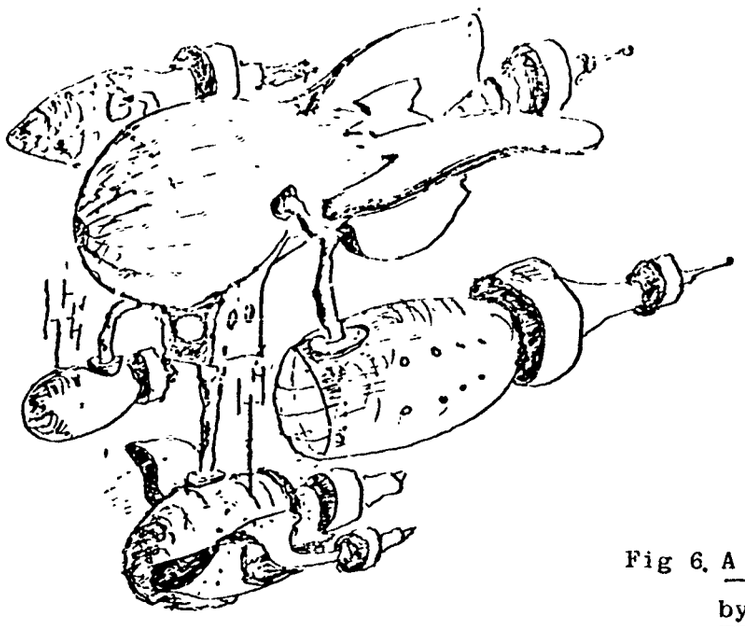
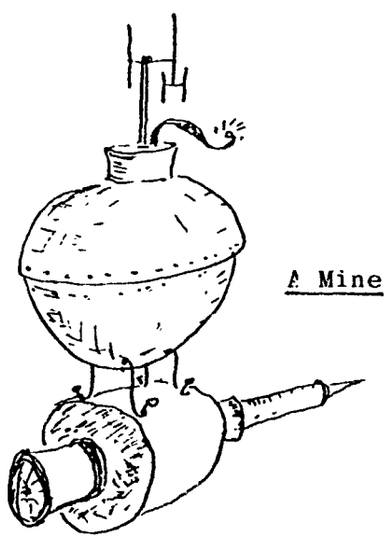


Fig 6. A spacecraft, symbolised by the letters X or Y

Fig 7. A Klingon, symbolised by the sign "*"



A Mine

Some caution is needed in overzealously annihilating Klingons, for the process dissipates an appreciable energy and this can damage the environment, literally make a crack,or fissure, in space. For relatively small energy dissipation in one region, the result is a hole; a cavity which is impenetrable to your spacecraft. Holes do not impede the movement of cargo ladened freighters because they are equipped with an automatic repairing device. However, it costs them all their cargo to use this device, so that holes are an embarrassment to trade if they are situated on one of the trading routes. You can repair a hole at the cost of energy by citing its coordinates in space and spending energy from both of your spacecraft (the repair cost is, and must be, distributed equally. Repair is a joint operation).

If the energy that is dissipated by the spacecraft (in dealing with Klingons) takes place near to certain lines of weakness that exist in the space environment, then it gives rise to a Crack which impedes the motions of all spacecraft and all cargo barges; it literally splits the spatial environment and restricts all movement. Crack repair has to be a cooperative business, both commanders must send at least one spacecraft each to the Crack, provide, and pay (in energy) for, repairers that knit the environment together, one of which is sketched in Fig 8.

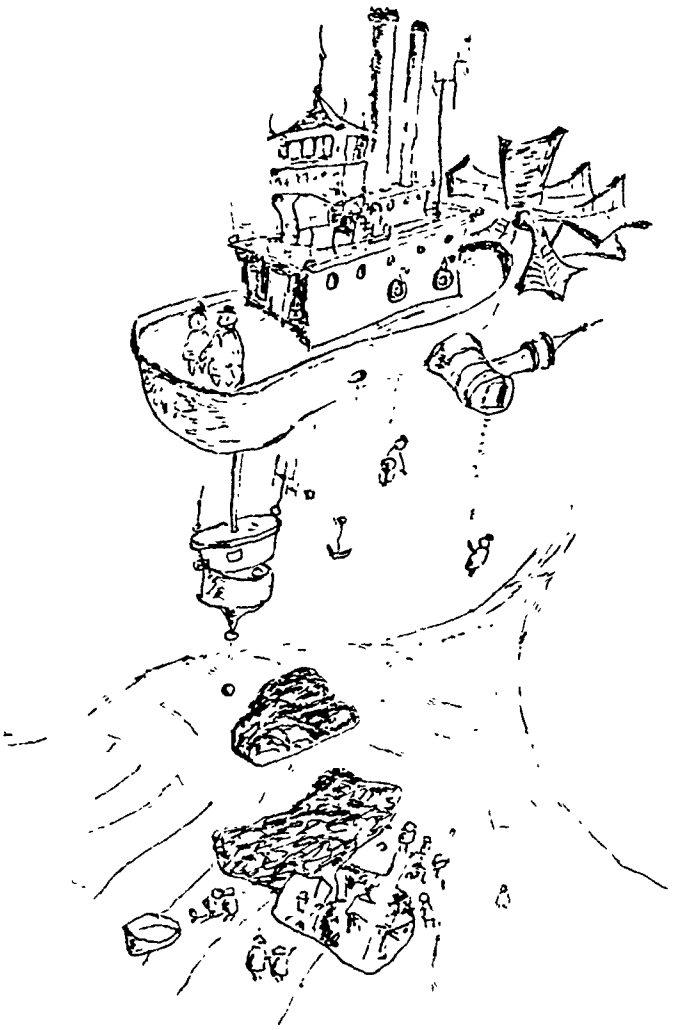


Fig 8. A Repairer and Holes

In the absence of any cracks, space would resemble a torus (the inner tube of a tyre, or doughnut). Cracks are responsible for changing the connectivity of the environment in quite dramatic ways. For example, there are two types of crack (on lines of weakness at the edge of a global display which you can obtain) that split the space environment into two kinds of cylinder; an "up down" type and a "right left" type. Cracks on other lines of weakness split the cylinder into a plane surface and dissect the plane surface into half planes ("up down" and "right left") or quadrants. Various combinations are possible, of which some are represented in Fig 9.

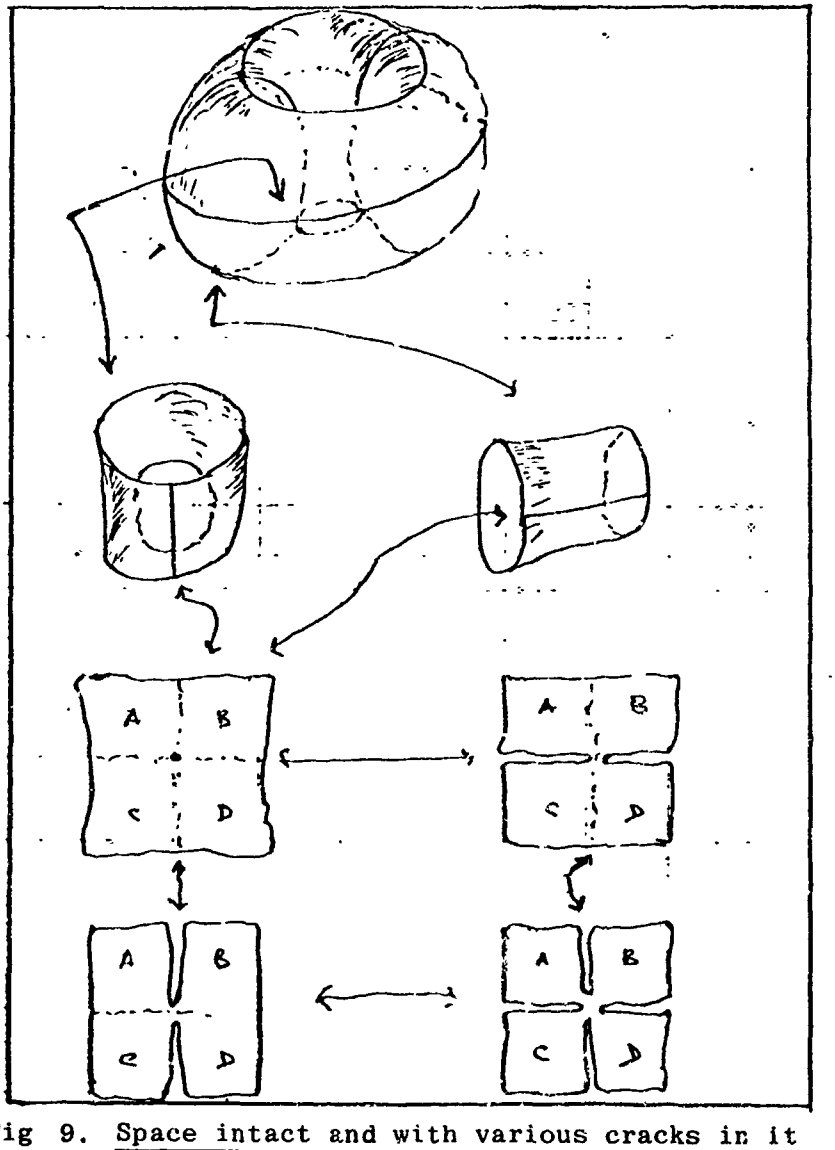


Fig 9. Space intact and with various cracks in it

Your spacecraft can bump into (and their motion is blocked by) Cracks. But you cannot bump into the other commander's spacecraft (nor can the other commander's spacecraft bump into yours). You cannot bump into barges or Klingons or your own spacecraft, because spacecraft are fitted with reverse thrust equipment that brings the vehicle (at considerable energetic cost) to a halt and prevents a collision.

If you go to any Starbase, you make a "vertical descent" and dock there. Upon docking at a Starbase, you are offered the option of investing surplus energy in its economy (as unmoveable real estate) and income (if any), accumulated from previous investment, is stated.

Although "altitude" does not have much meaning in space, there is a valid analogy between the motions of Spacecraft and an aircraft flying pattern. Starbases and Spacecraft have different assigned altitudes. Operations like mine laying, repairing, energy leaching and the like, involve a vertical descent, similar to docking at a Starbase.

Each spacecraft controller signals the commander (that is, you) an image of space which is a limited and rectangular "looking down" view with the spacecraft at the centre (this is like the view you would have "looking down" at the earth from a moving aircraft). You are, of course, able to navigate both spacecraft and to issue (somewhat limited) orders to their controllers. As guidance, you always have two "views" or "short range scans" of the space beneath each of your spacecraft (X and Y) in which you can see barges,

starbases, Klingons and possibly one of your own spacecraft (Fig 10.)

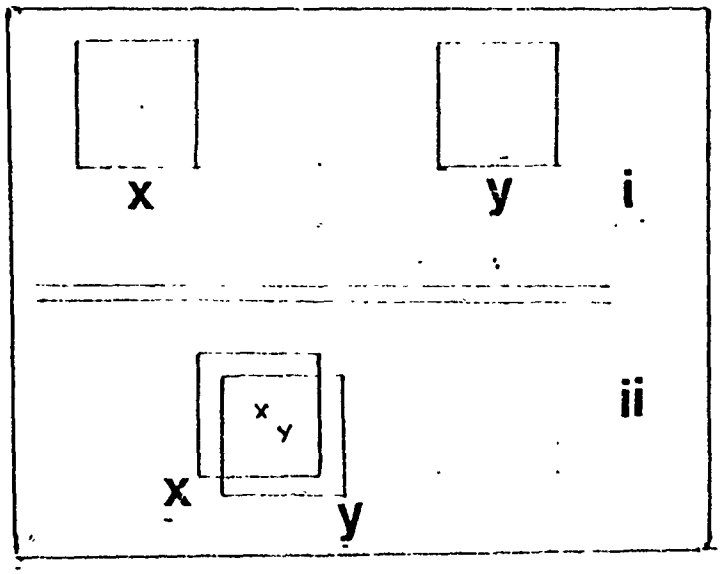


Fig 10. "Looking Down" views
(i) X invisible to Y, and Y invisible to X
(ii) Overlap (X in Y's view, Y in X's view)

The view displayed is of the position before the last movement of each spacecraft.

The short range scans give a very cicrumscribed or blinkered view of space .

A spacecraft (X or Y) has a position relative to the 4 Starbases which it obtains by sensing the amplitude of radio beacon signals. Each spacecraft is characterised by a sound tone or frequency and its relative position is signalled by a directional sound signal. This clearly provides global information to the commander and at no energetic cost. But the information is often ambiguous and not too precise.

Further, this information depends upon the connectivity of space. Cracks, being obstacles to all movement, are also obstacles which cut off radio beacon signals if they come between a Starbase and a Spacecraft.

Detailed global data is available, at an energetic cost if either Spacecraft X or Spacecraft Y is instructed to seek information. By using special sensors they can ascertain the state of Starbase economies, the distribution of all objects in all space, the distribution of specific objects such as Klingons and trading freighters (again, for all of space). They also have instruments able to observe the "inner space" where Klingons are said to come from and which (whatever "inner space" may be) have been used by observers over many years. However, it must be admitted that the exact constitution of inner space is still a matter of lively scientific debate. A few samples of this controversy indicate the present position, and you are likely to form your own hypotheses. For example, speaking of inner space, we have

".... Utterly random and lacking in intelligence"

".... This random process appears to be well determined by the following higher order Markov Process. Let.... " (here follows a great deal of mathematics)

".... it is possible to detect, classify the more important patterns and regularities. There is a deterministic element, suggesting intelligence..." (unfortunately, the classification does not include all such patterns, others being discovered repeatedly by the Copenhagen School and their coworkers, in Paris).

".... the rhythms clearly resemble the excitation of a block of neurones, and I am persuaded that it is brain like and, thus, intelligent"

"... a veritable quatermas, evidently fungoid but with considerable deductive powers".

".... this malicious constellation, continuously pulsating, has considerable beauty and this alone leads to ethical problems, an issue of moral judgement as well as scientific enquiry.."

".... Speculation is all very well; what we need is hard fact..."

".... this is our conjecture: a principle of parity. The Inner Space is an image, under certain transformations, of familiar objects in space as we know it, and that is all..."

The reader must form his own point of view.

From time to time, the individual Spacecraft controllers issue a request for a "next command" (for example, to move, to obtain information about the Starbase economy, to obtain global information about the disposition of objects in space, or to adopt a "tactic", ie. a list of instructions). If you are not able to give a next command (as a result of overload, for example), then the Spacecraft in question will move on its previously assigned course. This is like a very simple minded and often counter-productive tactic, but it is essential. Unless a Spacecraft is doing something specific (like obtaining information or docking at a Starbase), it must move.

Once again, there is a valid, though loose, analogy with aircraft navigation. If the Spacecraft did not move, wher acting as a vehicle, it would stall.

Your main goal is to maintain the overall economy.

Your pay as a mercenary depends upon an investment in Starbase economies, if you invest wisely. But any income depends upon the existence of at least some economy (also, upon the existence of your space ships) and, in this sense, also, the main goal (the mission), is primary.

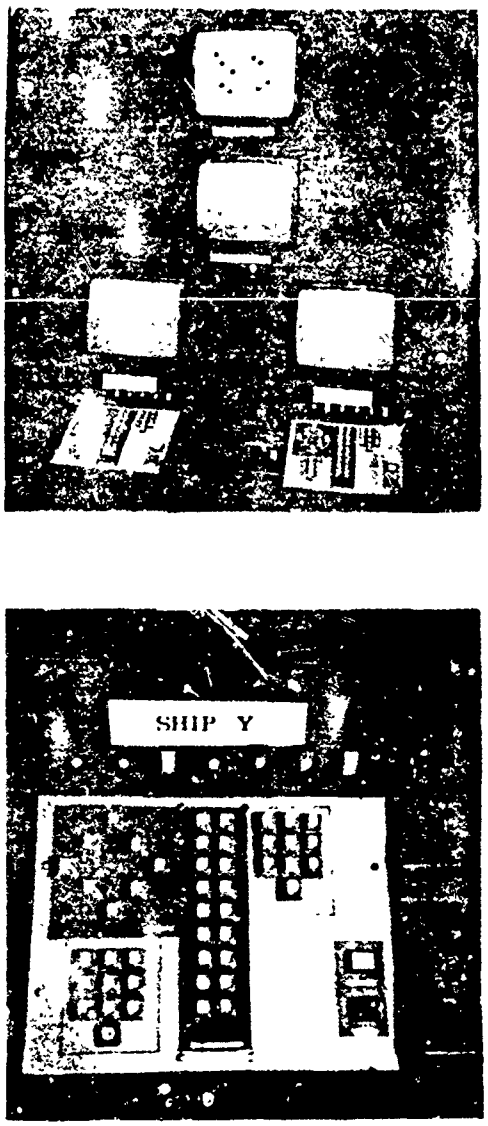


Fig 11 Spacecraft Console Controls for One Commander

2. Summary of Commands and Instructions

With this preliminary description of the mission concerned and of space itself, the following commands and instructions should make sense. If you are at all uneasy about them ask for further explanation when you have looked through these more detailed command statements. The interior of a Spacecraft is shown in Fig 11.

There is a display of the short range scan available after each move that a Spacecraft (X or Y) makes.

Each "spacecraft" or "ship" picks up a signal from radio beacons on each of the 4 Starbases unless they are separated from the radio source by a crack in space. Each spacecraft is assigned a sound frequency and gives its positional reference to the Starbases unless there is a crack between it and a beacon.

1. A move command is issued to Spacecraft X or Y.
(a) on the 0 to 7 direction X (left) Y (right) boards.

(b) by a distance of 1 to 16 units, on the X or Y numerical boards. Any move has a cost, in energy units (the amount of energy is shown on the TV display for Spacecraft X and Spacecraft Y, left and right hand side of the console).

(the amount of energy is shown on the TV Display for Spacecraft X and Spacecraft Y, left and right hand side of the console).

2. Movement will be terminated if a Spacecraft is in hazard of collision with any other object in its immediate vicinity and the deceleration entails loss of appreciable quantities of energy. The only object your Spacecraft can "sit on top of" is a Starbase, where (if your Spacecraft is "on" the position in the space occupied by a Starbase), it is possible to issue a dock and refuel command which gives rise to a vertical descent and an automatic refuelling with energy.

3. Investment of space energy, in the real estate of a Starbase, is offered as part of docking at that Starbase.

4. A short range (local) scan is given free after each move, but can be obtained, at unit cost, whenever you wish it, either for Spacecraft X or Y.

5. A Spacecraft must be on the move unless it is engaged in some other activity (recall the analogy with stalling an aircraft). Consequently, if you do nothing after a fairly brief interval, the Spacecraft controller (lacking other instructions from you) will make the last move again. You are able to manoeuvre the Spacecraft, yourself, but it is also possible to issue

6. A tactic command; which allows you to determine up to 8 tactics or sequences of instructions to be followed by either Spacecraft X or Y. (how to do so

is described in Section 5 of this manual.

7. Diverting commands from one Spacecraft to another involves a change ship command. If, at the moment, you are concerned with Spacecraft X, then "change ship" directs commands to Spacecraft Y, and vice versa.

8. Each Spacecraft depends upon having fuel in the form of energy (the amount left is shown, as before, on each display, X or Y). You receive a warning signal if any Spacecraft is short of energy (hence, in need of going to, and docking at, a Starbase to obtain more energetic fuel) but emergencies arise if either of your Spacecraft are hopelessly depleted

9. A destroy command is used to eliminate Klingons which appear in the display. Destroy dissipates radiation over a region of space where you place a mine at a cost in energy to the Spacecraft that places the mine. Klingons are symbolised, in the displays, as

*

On using this command, mine coordinates are requested and also the mine energy, ie. how much is to be spent. Only Klingons are influenced and to a degree proportional to the distance from the mine (but any Klingon in the short range scan of the Spacecraft laying a mine, receives some radiation). Further, Klingons accumulate radiation and at a critical level of 300 units they are completely eliminated.

10. As noted in the preliminary description, the dissipation of too much energy (320 units) gives rise to holes or (near the lines of weakness in space) to cracks. These are symbolised as shown in Fig 12 on the global scan

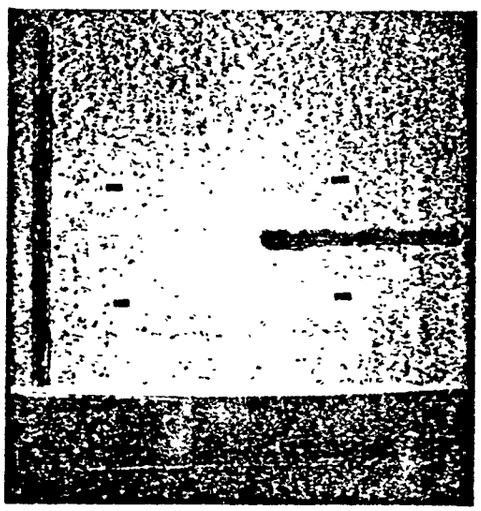


Fig 12: Global Scan of Cracks and holes

It is very easy to damage space.

11. To remedy damage (if you wish to do so) there is a repair command. Hole repair implicates one commander only. Crack repair involves cooperation between you and the other commanders (unless you are the only commander in the system). The repair command gives rise to a request for the coordinates in space of the position to be repaired and the expenditure of energy (which will be lost if there is nothing to repair at the position specified).

12. The other functions of Spacecraft have to do with obtaining information (at a cost in energy); establishing communication with the other commander (unless you are on your own).

3. Sound Signals

Each spacecraft has a characteristic sound frequency which identifies it.

Position relative to the 4 Starbases is signalled as a quadriphonic sound of loudness right, left, above, or below, representing any spacecraft orientation with respect to the Starbases, ie. the orientation on its short term scan screen.

The relative position is disturbed by cracks between the spacecraft and any one or more Starbases; cracks, being barriers to navigation, also act as barriers to a beacon signal. Hence, sudden change in amplitude (in contrast to changes produced by movement of the ship) indicate the appearance of cracks. This information is global, but not unambiguous. It is available, at no cost, for the ship receiving commands from you.

4. Global or General Information Available at a Cost in Energy

1. Global scan (of the entire universe) containing all objects in the universe (freighters, Spacecraft, Klingons, and Starbases, without discriminating identification, as one or other kind of object).

2. Global scan of trade routes currently in use (freighters, between the Starbases).

3. Global scan of Klingon distribution.

4. Global scan of the hypothesised "Inner Universe", (Scientific Data, over specified periods).

5. Current levels of all Starbase economies (investment in economy is only possible if Spacecraft is docked).

6. Communication with any other commander in the system.

All of these facilities are available, at a fixed cost in units of energy, to any Spacecraft.

5. Tactic Schedules

Certain tactics are used very commonly and are specified as schedules, or outlines, that are filled out with detail. So, as a result of issuing the tactic command (Section 2, Command No 6) you are asked whether you want to specify a tactic or to select one that you have already specified (perhaps there are none specified, at the outset there are none specified).

Selection in respect of a Spacecraft X or Y, places that ship X or Y under control of the specified tactic until it is complete, or you interrupt the operation.

The specification of a tactic calls for you to fill in details of one or more of the following schedules which, after that, become available (if selected) for automatic implementation.

The schedules are as follows and are filled in by using the central keyboard (Fig 11)

1. Move to Starbase (?), unless energy is less than (?), in which case dock at the nearest Starbase.

2. Move to Starbase (?), destroying all Klingons encountered, unless energy is less than (?), in which case dock at the nearest Starbase.

3. Continue on course (?), destroying all Klingons encountered, unless energy is less than (?) when signal the commander of this fact.

4. Move to the vicinity of other ship (X if Y tactic or Y if X tactic) unless energy is critical in which case signal the commander to that effect.

5. Move to any crack between Starbases (?) and (?) to effect repair, unless energy is critical in which case signal the commander to that effect.

6. Move to any hole between Starbase (?) and (?) to effect repair, unless energy is critical, in which case signal the commander to that effect.

You may have up to 8 tactics specified, for each of the Spacecraft.

6. Summary

Your job is to act as a mercenary in command of spacecraft X and Y; your mission is to protect all of the Starbase economy, so that the Starbase organisation is viable. You may, provided this goal is satisfied, invest energy in real estate on particular Starbases and so make a profit.

The supervisor requires mercenaries to react at once to the following mandates, noted in Section 1.

(a) Interrogation.

(b) Emergencies on Spacecraft or Starbases. In each case the central keyboard is used.

(c) Planning sessions which take place outside the space environment.

Appendix 6

Users Guide to the THOUGHTSTICKER System

THOUGHTSTICKER as an epistemological laboratory for expounding theories, hypotheses or for general authoring of expositions.

THOUGHTSTICKER will "insist" upon rules of exposition which are spelled out in this guide. Within this (very broad) framework, no constraint is placed upon what you assert.

You are required to render the representation coherent (as a reasonably supported finding , this renders whatever you do assert learnable and memorable). But the content and, in terms of style, the manner of your exposition is up to you. For example, it is not essential that you speak factually (a good story is learnable and memorable, even if it is a myth). Nor is the exposition straightjacketed in format, like, for instance, the format of a programmed text.

Above all, the thesis you expound is personalised and you, together with any colleagues who make a concerted exposition, are personally responsible for it. The system will submit overgeneralisations and spur you into stating as many lines of thought as possible. You may deny its overgeneralisations, if you like. Also, the system exhibits the consequences of what you say (enforcing the rules you have agreed to accept, if you use the system), which are often not intuitively obvious.

The main "language" of the system consists in a graph, representing relations between topics that are the nodes in the graph. The graph is known as an "entailment mesh" (or just a mesh). This graphical language can (and must) be augmented by text and demonstration material attached to topics.

Since you, yourself, are able, and encouraged, to find many ways of relating topics, it follows that any colleagues involved can incorporate their possibly quite different thoughts (if they are coherently related to your thoughts, then these expositions will be connected to yours, if not, several distinct meshes will coexist in the system).

The rules are as follows:

(1) A topic is something that you understand and which is potentially understandable to others. There is no absolute level of detail for a topic (it may be precisely specified, or "fuzzily", but consistently, specified). The level of detail you use is the level at which you can accept the consequences of certain rules.

(2) The rules are concerned with thinking and learning. They determine the "construction and reconstruction" or the "production and reproduction", of concepts. They are rules for expository common sense. They are as follows (details are given later)

(a) In order to justify a topic as legitimate, or acceptable to the THOUGHTSTICKER system, the following clauses (b), (c), (d), and (e) must be satisfied. Unless they are satisfied, you cannot instate a topic in the data structure but the conditions are checked by the system itself indirectly.
(b) A topic must be explicable or demonstrable, either in a concrete or intellectual (abstract, formal) manner .

It is important to recognise a commonly glossed over difference between a description and a topic as it exists. The topic as it exists is a representative of a reproducible concept; as such, it is a process, the process determined by

explaining or demonstrating (by making a working model of something). To show how this glossing over takes place, think of a fairly commonly agreed topic, say the topic, "sphere". You can describe a sphere by showing a soap bubble, a baloon, or the equations determining a geometrical surface. To explain or demonstrate and thus to capture the topic "sphere", you must make (literally, or intellectually) a constructive operation that results in something (concrete or intellectual) which satisfies a description of a sphere; for example, by forming a soap bubble, by inflating a baloon, or by providing a mathematical method that will generate spheres.

(c) Any topic must be derivable from two or more other topics which are, themselves, explicable or demonstrable. No topic can stand alone. There is nothing especially significant about the number of other topics involved in a derivation, but it is convenient, in discussion to refer to the minimal case of two other topics.
(d) The mesh of derivations is called an entailment mesh. At some stage it must be possible to identify or name, any topic in this mesh as distinct from others, ie. to describe each topic. A description is never unique; there is nothing sacrosanct about topic names. In this discussion, the non commital letters, P, Q, R, S, T are used to name topics.
(e) A derivation (the key term in this set of rules) is any series of operations that allows one to

construct one explanation, given a description of what is to be explained, out of other explanations without loss of specificity. It does not matter what the particular operations are, each person may use different operations. Provided there is no loss of specificity it will be possible to reconstruct or reproduce the original topics, given an understanding of the derived topic.

Strictly, these rules imply that you could explain or demonstrate any topic in an entailment mesh and, since a typical mesh may contain several hundred topics, this is certainly a tall order (even though various and rather liberal kinds of explanation count as quite legitimate; for example, working models, programs for computers, concrete demonstrations, mathematical proofs, roles to be enacted)

The requirement of explaining all of the many topics is, however, redundant (fortunately so), since a derivation is really an "explanation of an explanation", or an "explanation of how to explain something". So, in practice, only a small subset of the derivation-related topics need to be explained, or demonstrated and there is a great freedom of choice over which subset of the many you do explain. It depends, in fact, upon your "point of view" or "perspective" ; how you choose to look at the entailment-mesh.

You will be able (in fact, you will be bludgeoned into) adopting many "perspectives" or "points of view" which are presented as graphical displays on TV screens.

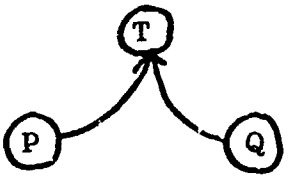
(3) In using THOUGHTSTICKER, you converse about topics and their connection to form an entailment mesh. At no point, however, do you "converse" with the machinery ; you do converse through the machinery. You may either converse with some other author or with yourself as in thinking aloud or ruminating (your conceptual operations, usually hidden from view, are "pulled out" by the system for subsequent scrutiny and modification)

(4) There are two kinds of topics. Ordinary topics and analogical topics, represented in a graphical notation. By convention, the word "topic" alone means "ordinary topic", and "analogical topics" are made explicit; the rules for instatement are somewhat different and the rules for "topics" (alias, "ordinary topics") are spelled out first.

(5) (a) The simplest topic, at whatever level you operate, satisfies a criterion of reconstructability.

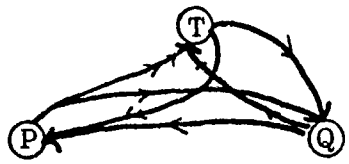
Let T be the topic in question, P and Q other topics. In order to instate T, you have to accept the consequences of the statement that "The explanation of T is derived from an explanation of P and of Q"

To assert this you press buttons on the topic board, draw a picture with crayon and receive instructions on the main TV display. As a notation the picture is

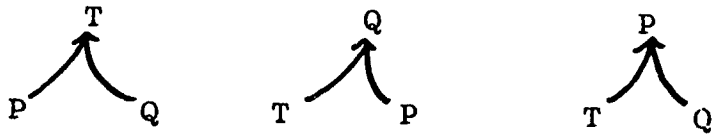


If so, two other statements follow immediately, from the initial criterion, namely, "The explanation of P can be derived from an explanation of T and of Q" and "an explanation of Q is derived from an explanation of T and P".

The THOUGHTSTICKER system converts your picture into its picture



The system shows you the consequences of your statement on a series of storage tubes and, in this very simple case, they are are follows:

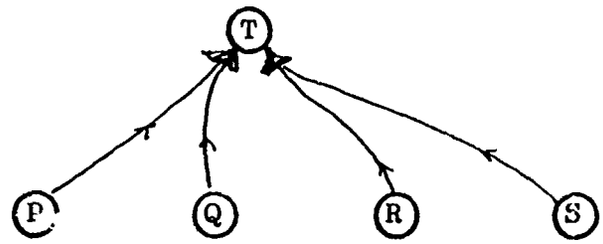


unless you disagree (you are asked if you do) the structure is instated.

(b) From the perspective, or point of <u>view</u>, that topic T is <u>being derived</u>, there may be, and usually are, several ways of deriving topic T; for example, either from P and Q or from R and S (other topics, at least one other).

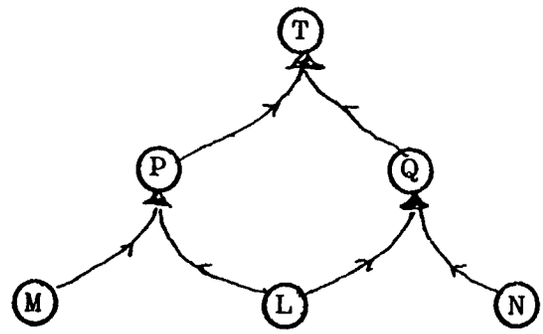
Derivation paths are kept distinct, and the criterion of reconstructability is applied to each path in isolation. Technically, a derivation path is called a <u>kernel</u>; any topic

may have several kernels . For example

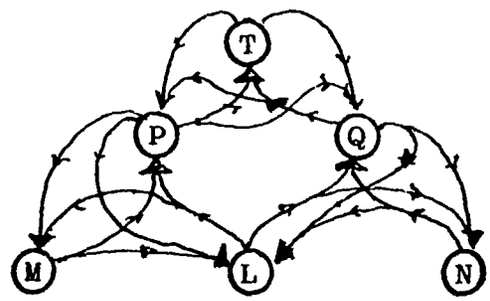


(c) From the perspective, or point of view, that T is being derived, P and Q (of (a)) seem to be primitives or prerequisites.

(d) Keeping the same perspective (T) you are required to derive these primitive - under -T topics or, in jargon, to unzip P and Q as primitive topics, under T. This leads to an apparently hierarchical structure; say P is derived from L and M; Q is derived from L and N, as below

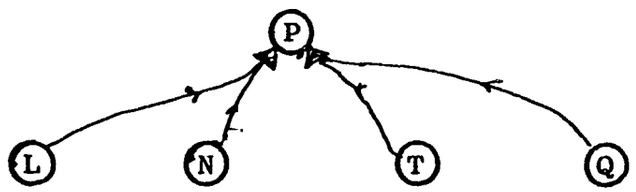


which the system converts into

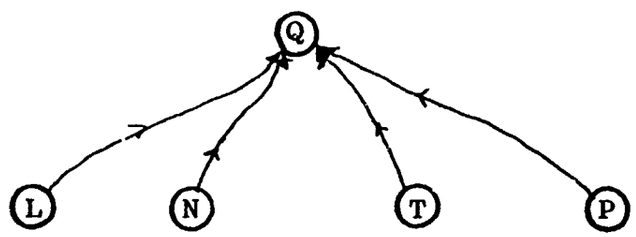


(e) Scrutiny of (a) shows that the hierarchy is perspective-dependent. You might have taken the perspective P or Q (or L, M, N, in (d))

So, for example,



under P, or



under Q.

The criterion of reconstructability implies a locally cyclic, or tautologous, structure upon topics and may, if you wish, be regarded as the covert insertion of additional kernels (over and above those contained in a perspective-oriented statement).

This property, familiar in formal systems with axioms, is shared by informal systems of thought, for example, let P be "distance in a plane", Q be "taking a fixed distance from any given point", let T be "a circle; the locus of points equidistant from any given point". This is a formal scheme. Reconstructability means that an acceptable definition of a circle retains definitions of distance, and equidistance from any given point.

On the other hand, let P be "arena" (in the sociological sense) Q be "people at specified times", let T be "an institution, namely, a location in which people can meet to communicate at specified times". All of P, Q, and T are Fuzzily defined. But their Fuzzy definitions are coherently related.

(f) The hierarchical structures obtained from an entailment mesh when it is seen from a particular perspective (point of view) are called pruning and are used by the system to check any kernels or nodes that are introduced.

You may also call for pruning, as a user, by specifying a topic and pressing the appropriate key. Several prunings may coexist (4 can be displayed simultaneously on storage tubes for comparison or contrast; above that number the display is deleted (there are 4 storage tubes)

A pruning consists in a collection of derivation paths, usually many corresponding to sequences of kernels. For example, if T is derived from R and S or P and Q (which in turn are derived from L and M from L and N) the paths T (R,S) and T (P(L,M) Q (L,N))

Prunings restricted to specific derivation

paths are known as selective prunings. These also are used by the system in checking additions to an entailment mesh. You may also call for selective prunings by pressing the selective pruning key specifying one initial topic and a series of further topics to select the required derivations.

(g) Apart from local cyclicity, derivation may be other-than-locally cyclic; for example, one principle may be applied repeatedly (which, under a different perspective, is equivalent to saying that the principle is exhibited by various, equally valid, instances of its application or use).

Like the multiple kernels of (b) (namely T from P and Q, or from R and S), other-than-local cyclicity makes a genuine redundancy in an exposition which is to be encouraged. There is no best exposition any more than there is a best perspective.

(h) Any kernel may be condensed to a topic in a mesh of higher order (as in (1), the level of exposition is arbitrary). Any collection of kernels as in (b), can be condensed to a topic in a mesh of higher order. Any other-than locally-cyclic structure must be condensed to a topic in a mesh of higher order. Topics (at any order) cannot stand on their own; a mesh must be created around them (as in clause (2) item (a)) .

The converse operation of condensation is called expansion. Both condensation and expansion are carried out automatically but with differing results depending upon how the topics are organised.

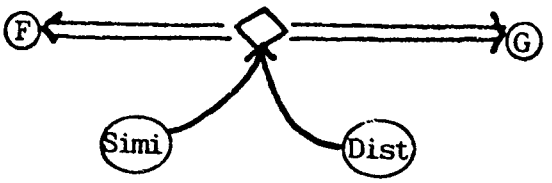
If a structure (in a mesh of given order) is condensed to a topic in a mesh of higher order and left alone, expansion replicates the original. If, as required to satisfy non isolation (Clause (2) item (a)), the isolated higher order topics are woven into a higher order mesh, then there are usually several different but well determined expansions. (The information added in a higher order mesh is introduced into the expansion to a lower order mesh). If a topic in the original order of mesh is expanded, without previous condensation, then information must be added by you, the user; this is the operation of "unzipping" noted in (d) (the unzipping of P and Q).

(6) If you are expounding a thesis which is made up of (simple) topics you are (rather obviously) representing information as a static inscription. The THOUGHTSTICKER system forces you to do so, either by requiring unzipping, or the production of alternative kernels, or by condensing a mesh to a mesh of higher order and expanding it. In each case, you are also required to see your exposition from different perspectives in order to satisfy the criterion, noted in (a), of reconstructability.

(7) Analogical topics are relations holding between topics in an entailment mesh, or between complete meshes. Any analogy consists in a similarity and an indefinite number of distinctions.

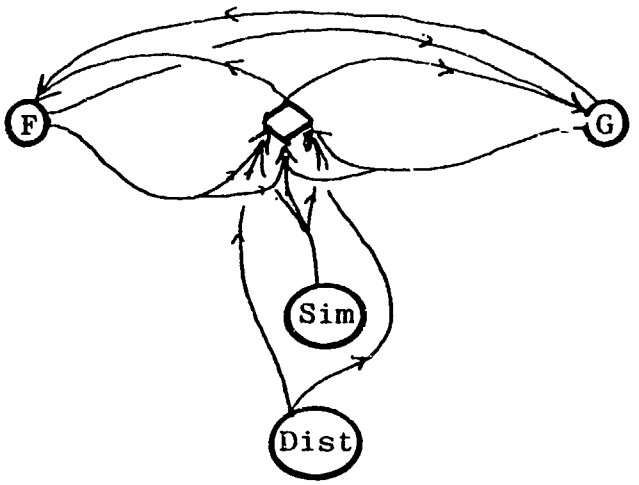
(a) If you, as a user, assert an analogy between topic F and topic G , and say no more, then it is assumed (the THOUGHTSTICKER system acts as though) you meant the similarity to be isomorphic (a one to one correspondence) and the distinction to be any distinction, whatever.

The notation is



the diamond being the analogy topic

This notation is a shorthand for the more complex representation shown below which, lacking any qualification, means that topics F, G, are replicas (an isomorphism) but independent, apart from the asserted similarity.



That is, given the analogy and topic F, it is possible to derive topic G; given the analogy and topic G it is possible to derive topic F; given F and G and the similarity, to derive the analogy topic; given either F or G, the similarity and the distinction to derive the analogy topic.

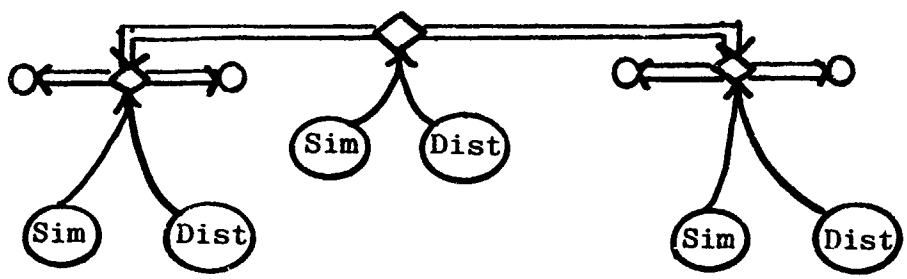
Under these assumptions, any analogical topic can be instated, even down-right silly ones.

The system exhibits the consequences of this assumption. For example, in geometry, if F is a triangle, with apices labelled a, b, c, and G is a triangle with apices labelled a, b*, c*, then F and G are assumed to be "equivalent" (though distinct) triangles. That induces very many analogies, between whatever derivation led up to F and G; you would find these analogies nuisanceful, if you only intended F and G to be "similar" (ie. their sides could have any length, provided the angles remain fixed) or, if you just wanted to say that F and G are different, but both triangular.*

(b) You could have qualified the analogy by asserting, also, a specific similarity or a specific distinction, or both. Failing that, the system forces you to be specific, by displaying the consequences of your statement.

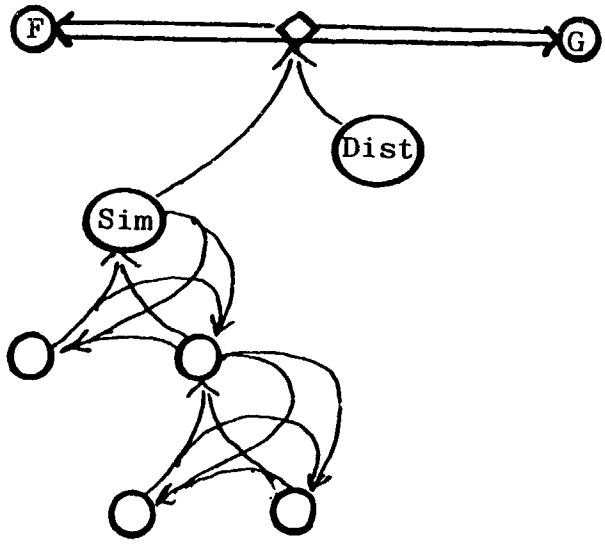
Consider the consequences of not being specific if F and G stand for two social systems, or two different kinds of system (say, "economic" and "status oriented"). You can either avoid the nonsensical results by making the proper restrictions and distinctions, or you can specify the similarity and distinction by deleting some of the consequences inferred.

(c) Analogies can hold between analogical topics



(d) Entailment meshes may be condensed under analogical topics, and condensations are open to expansion (in general, however, information must be added in the process, for, unlike topics-unqualified, analogical topics do not have a fully-cyclic structure).

(e) If an analogical topic is constructed in this standard manner with a similarity and a distinction underlying it, then it is an analogy of form (Sim is a morphism and usually a restricted morphism). But suppose that Sim is, itself, derived in a particular manner so that a method of determining the similarity is made explicit. If so (and the construction is entirely legitimate), then the analogical topic is an analogy of form and method which relates the derivations of the topics related by the analogical topic.



(8) The THOUGHTSTICKER system does not think; but if you have given it information it can, and does, overgeneralise, both in respect of topics and analogical topics. An overgeneralisation, which is displayed, may be denied.

By overgeneralising, the system promotes exposition; by requiring condensation, expansion and unzipping, it also promotes exposition. It ensures that any representation is coherent, by forcing you to adopt different perspectives, and by displaying the consequences of statements.

Clauses (1) to (8) are not an exposition of the theory of entailment meshes but they are statements giving a fair idea of the rules you should agree to accept if you use the THOUGHTSTICKER system, to make a representation, and of processes that follow from these rules.

Appendix 7

Machine Language program for Conway Automaton on Tesselation Surface

```
0001 *
0002 CONWY: ENT
0003   LDA GSTART
0004   ADD GLNTH
0005   LLA 1
0006   STA STARY
0007   LDA GSTART
0008   ADD GLNTH
0009   ADD CLNTH
0010   LLA 1
0011   STA NSTARY
0012   JST YL1     COMPUTE NEW CONFIG
0013   JST COPY
0014   RTN CONWY:
0015 *
0016 CLNTH DATA 578
0017 ARLN DATA 1156
0018 GLNTH DATA 4096
0019 SETX DATA 34
0020 SETY DATA 34
0021 NSTARY HLT
0022 *
0023 *
0024 *COPY-COPIES ARRAY POINTED TO BY NSTARY INTO
0025 *ARRAY POINTED TO BY  STARY
0026 *
0027 COPY ENT
0028   LDA ARLN
0029   NAR
0030   STA CCNT
0031   LDA NSTARY
0032   STA :32
0033   LDA STARY
0034   STA :31
0035   SBM
0036 COPY1 LDAB *:32
0037   STAB *:31
0038   IMS :32
0039   IMS :31
0040   IMS CCNT
0041   JMP COPY1 LOOP
0042   SWM
0043   RTN COPY EXIT
0044 CCNT HLT
0045 *
```

```
0046 YL1 ENT
0047   LDA SETY SCAN OLD ARRAY,SET NEW ARRAY
0048   SAI 2
0049   NAR
0050   STA YLCNT SET Y COUNTER
0051   LDA STARY
0052   STA :32  SET Y POINTER
0053       LDA  NSTARY
0054   ADD SETX
0055   STA :31  SET NY POINTER
0056   LDA SPP
0057   STA PP  RESET PUTATIVE PARENT POINTER
0058 XL1 LDA SETX
0059   SAI 2
0060   NAR
0061   STA XLCNT  SET X COUNTER
0062   XRP
0063   STX NXR SET NX POINTER
0064   ZXR     SET X POINTER
0065 XL2 JST IL1 SCAN ARRAY BOX SET NEW ARRAY POINT
0066   IXR RETURN
0067   IMS NXR
0068  IMS XLCNT
0069   JMP XL2 LOOP ON X,NXR
0070 YL2 LDA :32
0071   ADD SETX
0072   STA :32 INCR. Y POINTER
0073   LDA :31
0074   ADD SETX
0075   STA :31  INCR. NY POINTER
0076   IMS YLCNT
0077   JMP XL1  LOOP ON Y,NY
0078   RTN YL1 RETURN
0079 *
0080 POPCNT HLT
0081 XLCNT HLT
0082 YLCNT HLT
0083 SAC1 HLT
```

```
0084 *ENTRY:  :32 CONTAINS POINTER TO ROW (OUTER ARRAY)
0085 *         X  POINTS TO COL IN OUTER ARRAY
0086 *         :31 POINTS TO NEW ROW IN INNER ARRAY
0087 *         NXR POINTS TO NW COL IN INNER ARRAY
0088 *
0089 IL1 ENT
0090  LDA SPP
0091  STA PP
0092   ROV
0093 IL11 LAM 3
0094   STA C1 SET 3 COUNT
0095   SBM
0096 IL2 LDAB *@:32 NEXT CELL
0097   STAB *PP  SET DATA OF PUTATIVE PARENT
0098   IMS PP
0099   IXR
0100   IMS C1
0101   JMP IL2 LOOP
0102   JOS SETCEL EXIT
0103   SOV
0104   SIN 3
0105   LDA :32
0106   ADD SETX
0107   STA :32 INCR Y COUNT
0108   SXI 3 RESET X COUNT
0109   LDAB *@:32
0110   STAP *PP
0111   IMS PP
0112   IXR
0113   LDAB *@:32  CENTRE CELL
0114  SIN 1
0115   STA CELLF STORE DATA ABOUT CELL
0116   IXR
0117   LDAB *@:32
0118   STAB *PP
0119   IMS PP
0120   SXI 2 RESET X COUNT
0121   SWM
0122   LDA :32
0123   ADD SETX
0124   STA :32 INCR Y COUNT
0125   JMP IL11 REPEAT FIRST LOOP,EXIT SETCEL
0126 *SETCEL-SETS NEW CELL IN ARRAY
0127 *RESTORES X,Y POINTER FOR NEXT IL LOOP
0128 SETCEL SWM
0129   LDA :32
0130   SUB SETX
0131   SUB SETX
0132   STA :32 RESTORE Y COUNT
0133   SXI 3 RESTORE X COUNT
0134   STX XR  STORE X
0135     JST GRNT  COMPUTE NEW GENERATION, RESULT IN A
0136  JAZ $+2
0137  IMS POPCNT
0138   LDX NXR SET X POINTER
0139   SBM
0140   STAB *@:31 SET NEW CELL
0141   SWM
0142   LDX XR
0143   RTN IL1
0144 XR HLT
0145 NXR HLT
0146 C1 HLT
```

```
0147 *EIGHT NEIGHBOURS STORED IN SPIRALS STARTS @ P. 0000.
0148 *CELLF HOLDS INFO ABOUT CELL BEING EXAMINED
0149 *RETURNS WITH NEW CELL INFO IN A.
0150 *NB: SPP IN BYTE MODE, SPARNT IN WORD MODE
0151 GPNT ENT
0152   LDA SPP
0153   STA PP
0154   LDA SPARNT
0155   STA PARNT
0156   LAM 4
0157   STA GC1 PARENT COUNT
0158   LAM 8
0159  STA GC2
0160   ZXR X=SURVIVAL COUNT
0161   SBM
0162 GL1 LDAB *PP
0163   IMS PP
0164  JAZ GL2 NEIGHBOUR=ZERO
0165   SIN 1
0166   STA *PARNT
0167   IMS PARNT
0168   IXR  INCR SURVIVAL COUNT
0169   IMS GC2
0170   JMP $+2
0171   JMP GL3 SPP FINISHED
0172   IMS GC1
0173   JMP GL1  LOOP
0174 GL11 ZAR  DEATH MORE THAN 3 NEIGHBOURS
0175   SWM
0176   RTN GRNT EXIT
0177 GL2 IMS GC2
0178   JMP GL1 LOOP
0179 GL3 SWM
0180  CXI 2
0181   JMP GL4  2 NEIGHBOURS
0182   CXI 3
0183   JMP GL6 3 NEIGHBOURS
0184   JMP GL11 DEATH
0185 GL4 LDA CELLF
0186   JAN GL5
0187   RTN GRNT EXIT
0188 GL5 AAI 1 INCR. GEN. NO.
0189   ROV
0190  BAO 5
0191   JOR $+2
0192   SAI 1 FORCE GENERATION NUMBER <32
0193   RTN GRNT EXIT
0194 GL6 LDA CELLF
0195   JAN GL5 CELL EXISTS
0196 *SPECIES GENERATION RULE (TWO SPECIES)
0197 GL7 LDA BPARNT
0198   ADD BPARNT+1
0199   ADD BPARNT+2
0200   ROV
0201   BAO 8
0202   LAP 1 FIRST GENERATION
0203   JOR $+2
0204   AAI :80 SPECIES 1
0205   RTN GRNT EXIT
0206 GC1 HLT
0207 GC2 HLT
0208 CELLF DATA 0
0209 PARNT HLT
0210 BPARNT RES 4,0 BUFFER FOR PARENTS
0211 SPARNT DATA BPARNT POINTER TO ABOVE
0212 PP HLT
0213 BPP RES 4,0 BUFFER FOR PUTATIVE PARENTS
0214 SPP BAC BPP
0215 *
0216   END
```

Appendix 8

A Back up Program on BASIC with MLs capable of execution on a serial machine provided with 6 independently addressable input keyboards 8 independently addressable video displays and 8 audio channels activated from D tc A modulators

```
0001 REM INIT FOR TWO CABIN SPACE.
0002 REM CHECK LINES 5  96  97  WITH MAIN PROGRAM.
5 GOSUB 1090
27LETES="XY"
29MATP=ZER
30DATA0,-1,1,-1,1,0,1,1,0,1,-1,1,-1,0,-1,-1
35LETL=1
40LETB7=0
45LETAS="ABCDEFGHI"
50LETNS="0123456789"
51CALL(6,(C+4)+(B7*6),0)
55LETCS="MSRDCIG1234567"
56LETT(1,2,B7+1)=1
57LETXS(0,4)=XS(9,13)="BADC"
60CALL(6,B7+2,0)
61LETX(0,1)=Y(0,1)=45
62LETX(1,1)=Y(1,1)=30
65GOSUB80
66LETE(0,0)=E(0,1)=E(1,1)=E(1,0)=10000
67LETX=X(0,0)=Y=Y(0,0)=5
68LETX(1,0)=Y(1,0)=27
70GOTO99
80FORI=1TO6
85PRINT
90NEXTI
91RETURN
96 GOSUB 8750
97 GOSUB 4000
99LETB(0,0)=B(0,1)=B(1,1)=B(1,0)=1
100PRINT"YOU ARE NOW IN COMMAND."
101FORB7=0TO1
102FORI=1TO4
103LETT(1,3,B7+1)=20000
105NEXTI
106NEXTB7
107LETB7=0
110FORW=1TO32
115PRINT
120PRINT
125LETA=1
130GOSUB132
131GOTO160
132FORB=0TO 15
133READA(B)
134NEXTB
135MATREAD M
136GOTO9702
140FORX=1TO32
145FORB=1TO368*A
150NEXTB
155RETURN
156CALL(6,1,0)
160PRINT
165PRINT"SHIP X:ENERGY=10,000"
167GOSUB260
168CALL(6,B7+2,0)
170PRINT
175PRINT"COMMAND ";
176GOTO190
177PRINT
```



```
178PRINT
179GOSUB7105
181PRINT
182CALL(6,B7+2,0)
183FORA=0TO 150
184NEXTA
185IF(IS(0,0)<>"S")*(IS(0,0)<>"M")GOTO80188
186IFF(B7)<>1GOTO80188
188GOSUB197
189PRINT"COMMAND ";
190GOTO3355
191FORA=0TO13
195IFIS(0,0)=CS(A,A)GOTO8211
196GOTO200
197PRINTTAB(9);"SHIP X  SHIP Y"
198PRINT"ENERGY";TAB(8);E(0,B7);TAB(17);E(1,B7)
199RETURN
200NEXTA
205CALL(6,B7+2,0)
206PRINT"NOT VALID"
210GOTO188
211LETA=A+1
212LETF(B7)=0
214IF(A>7)*(C=0)GOTO1130
215IF(A<5)*(C=1)GOTO1130
216LETKS(N(B7)+(B7*20),N(B7)+(B7*20))=CS(A-1,A-1)
217LETN(B7)=N(B7)+1
218LET ZS(N(B7)+(B7*20)-1,N(B7)+(B7*20)-1)=" "
220ONAGOTO230,235,240,245,250,255,257,230,235,240,245,250,255,25
225GOTO205
230GOTO506
235GOSUB262
236GOSUB295
237GOTO7001
240GOTO1801
245GOTO1300
250CALL(6,B7+2,0)
251GOTO5001
255GOTO2101
257GOTO4104
260GOSUB262
261GOTO290
262CALL(5)
263CALL(6,B7,C,X,Y,1)
264RETURN
275CALL(6,(C+4)+(B7*6),0)
276GOSUB80
290PRINT
291LET F9=0
292LET F8=0
295FORB=Y-4TOY+4
296LETB2=MOD(B,64)
305FORA=X-4TOX+4
306LETA2=MOD(A,64)
310CALL(5,T,A2,B2,1)
311IFT=0GOTO455
315LETT1=INT(T/1024)
320IFT1>11GOTO360
325IFT1<4GOTO455
330ONT1GOTO335,335,335,345,347,352
```

```
335GOTO360
345GOTO455
347GOTO455
352LETE(4,B7)=500
353LETF(B7)=1
354LETK9=K9+1
355GOTO455
360LETT1=T1-6
361IF(T1>3)*(T1<6)*(B7=0)GOTO455
362IF(T1>1)*(T1<4)*(B7=1)GOTO455
365ONT1GOTO352,380,390,380,390
370GOTO395
380GOTO455
390GOTO455
395LETT1=T1-5
400ONT1GOTO411,421,431,441
405GOTO454
411GOSUB3245
415GOTO455
421GOSUB3260
425GOTO455
431GOSUB3275
435GOTO455
441GOSUB3290
442LET F8=4
445GOTO455
451GOTO455
454LET F9=F9+1
455NEXTA
460NEXTB
461PRINT
462LETE(C,B7)=E(C,B7)-E(4,B7)
463GOSUB4685
470RETURN
506LETF(B7)=0
510CALL(6,B7+2,0)
511LETD1=0
5121FM$(0,0)="X"GOTO3450
515PRINT"SELECT COURSE ";
520INPUTE
525IFE<8GOTO0540
530PRINT"WHOLE NUMBER(0-7)ONLY."
531PRINT
535GOTO515
540LETE=INT(E)
542LETB(C,B7)=E
545PRINT"HOW FAR (1-16) ";
546LETT(INT((E+2)/2),2,B7+1)=1
550INPUTF
555IF(F>=1)*(F<=16)GOTO0575
560PRINT"NOT VALID"
565PRINT
570GOTO545
575LETF=INT(F)
585FORD=1TOF
590LETA1=X+A(E*2)
595LETB1=Y+A((E*2)+1)
600LETA1=MOD(A1,64)
605LETB1=MOD(B1,64)
610CALL(5,T,A1,B1,1)
```



```
615LETT1=INT(T/1024)
620IFT1=0GOTO0701
6211F(T1>11)*(T1<16)G0T00623
622GOTO628
623LETT3=T1
624IF(F-D)<>0GOTO0628
625LETD1=1
627GOTO646
628LETE(C,B7)=E(C,B7)-1000
630PRINT
635PRINT"NEAR COLLISION-REVERSE THRUST"
640PRINT"APPLIED AT COST OF 1000 UNITS"
641IFE(C,B7)>500GOTO0645
642LETE(C,B7)=500
645PRINT
646LETA1=A1-A(E*2)
647LETB1=B1-A((E*2)+1)
648LETA1=MOD(A1,64)
649LETB1=MOD(B1,64)
650LETD=F
651GOTO701
655IF(T1<8)+(T1>11)G0T00665
660G0T0625
665IFT1<12GOTO0700
6751F(F-D)<>0GOTO0690
680LETD1=1
681LETT3=T1
685G0T0646
690IF(F-D)<>1G0T00700
691LETT3=T1
695LETD1=1
701LETT=0
702CALL(5,T,X,Y,2)
703LETX=A1
704LETY=B1
708IFE(C,B7)<=500GOTO0711
710LETE(C,B7)=E(C,B7)-50
711NEXTD
7121FC=1G0T00715
713LETT=9192+(2048*B7)
714GOTO717
715LETT=10216+(2048*B7)
717CALL(5,T,A1,B1,2)
718GOSUB1225
7211FM$<>"X"GOTO0726
722LETM$(0,0)=" "
723GOTO7001
724GOSUB260
725G0T0191
726GOSUB260
730GOTO7001
0750 REM ROUTINE TO SET OBJECTS
0755 LET T= 13288
0760 LET A=B*16
0765 CALL (5,T,A,B,2)
0770 LET T=14312
0775 LET A=48
0780 CALL (5,T,A,B,2)
0785 LET T=15336
0790 LET A=16
```

```
0795 LET B=46
0800 CALL (5,T,A,B,2)
0805 LET T=16360
0806 LET A=B=45
0810 CALL (5,T,A,B,2)
815 LET T=9192
0820 LET A=B=8
0825 CALL (5,T,A,B,2)
0830 LET T=10216
0835 LET A=B=27
0840 CALL (5,T,A,B,2)
0845 LET A=B=15
0850 LET T=20468
0855 CALL (5,T,A,B,2)
0860 LET T=29172
0865 LET A=B=47
0870 CALL (5,T,A,B,2)
0875 LET A=49
0880 LET B=15
0885 LET T=23540
0890 CALL (5,T,A,B,2)
0895 REM
0900 LET A=17
0905 LET B=47
0910 LET T=26100
0915 CALL (5,T,A,B,2)
0920 LET T=23802
0925 LET A=46
0930 LET B=17
0935 CALL (5,T,A,B,2)
0940 LET A=46
0945 LET B=49
0950 LET T=30458
0955 CALL (5,T,A,B,2)
0960 LET A=15
0965 LET B=46
0970 LET T=28410
0975 CALL (5,T,A,B,2)
0980 LET T=30970
0985 LET A=47
0990 LET B=46
0995 CALL (5,T,A,B,2)
1000 LET T=17658
1005 LET A=17
1010 LET B=16
1015 CALL (5,T,A,B,2)
1020 LET T=21242
1025 LET A=49
1030 LET B=16
1035 CALL (5,T,A,B,2)
1036 LET T=6444
1037 LET A=10
1038 LET B=10
1039 CALL (5,T,A,B,2)
1040 LET T=18682
1045 LET A=16
1050 LET B=17
1055 CALL (5,T,A,B,2)
1060 LET T=25338
1065 LET A=16
```



```
1070 LET B=49
1075 CALL (5,T,A,B,2)
1076 RETURN
1090 LET T=0
1091 FOR I=0 TO 127
1092 CALL (5,0,I,0,4)
1093 NEXT I
1095 FOR A=0TO63
1100 FOR B = 0 TO 63
1102 LET T=6444+(INT(RND(0)*150+1)=1)
1105 CALL(5,T,A,B,2)
1110 NEXT B
1115 NEXT A
1120 RETURN
1130IFC=1GOTO1175
1132LETC=1
1135LETX=X(C,B7)
1140LETY=Y(C,B7)
1155CALL(6,(C+4)+(B7*6),0)
1156IFMS(0,0)="Y"G0T07001
1159IFMS(0,0)<>"X"G0T01164
1160LETA=8
1163G0T0216
1164CALL(8)
1170G0T0216
1175LETC=0
1176LETX=X(C,B7)
1180LETY=Y(C,B7)
1195CALL(6,(C+4)+(B7*6),0)
1196IFMS(0,0)="Y"G0T07001
1201IFMS(0,0)<>"X"G0T01206
1202LETA=1
1205G0T0216
1206CALL(8)
1215G0T0216
1225LETX(C,B7)=X
1230LETY(C,B7)=Y
1235RETURN
1300CALL(6,B7+2,0)
1305PRINT
1306PRINT
1310PRINT"POSITION THE MINE"
1311GOSUB1315
1312G0T01430
1315PRINT
1320PRINT"LETTER ";
1325INPUTMS
1330FORJ=0TO8
1335IFMS=A$(J,J)G0TO1365
1340NEXTJ
1345PRINT"NOT VALID "
1350GOTO1320
1365LETM1=MOD(X-(4-J),64)
1370PRINT
1375PRINT"NUMBER ";
1380INPUTMS
1385FORJ=1TO9
1390IFMS=N$(J,J)THEN1415
1395NEXTJ
1400PRINT"NOT VALID"
```

```
1405GOTO1370
1415LETJ=J-1
1420LETH2=MOD(Y-(4-J),64)
1425PRINT
1426RETURN
1430PRINT"ENERGY AVAILABLE=";E(C,B7)
1435PRINT"HOW MANY UNITS FOR MINE ";
1440INPUTM3
1445IFE(C,B7)-(M3-1)>0GOTO1460
1450PRINT"TOO MUCH"
1451PRINT
1455GOTO1430
1460LETE(C,B7)=E(C,B7)-M3
1461LETM7=M3
1495FORB=Y-4TOY+4
1500LETB2=MOD (B,64)
1505FORA=X-4TOX+4
1510LETA2=MOD(A,64)
1515CALL(5,T,A2,B2,1)
1516LETT1=INT(T/1024)
1520IF(T1<6)+(T1>7)THEN1665
1535LETM3=MOD((M1-A2),64)
1540IFM3<10GOTO1550
1545LETM3=MOD((A2-M1),64)
1550LETM4=MOD((M2-B2),64)
1555IFM4<10GOTO1565
1560LETM4=MOD((B2-M2),64)
1565LETK1=T-INT(T/1024)*1024
1575IFM4<M3GOTO1590
1580LETM5=M4
1585GOTO1591
1590LETM5=M3
1591LETM5=M5+1
1595IFM5=0GOTO1605
1600LETM9=M7/M5
1601PRINTINT(M9);TAB(9);"UNIT HIT"
1605LETK1=K1-M9
1610IFK1>0GOTO1650
1615LETT=0
1620CALL(5,T,A2,B2,0)
1621LETH1=H1+1
1622GOSUB5940
1630IFM7<320GOTO1665
1631GOTO2625
1635LETT=4096
1636LETH2=H2+1
1640CALL(5,T,A2,B2,2)
1645GOTO1665
1650LETT=(T1*1024)+K1
1660CALL(5,T,A2,B2,2)
1665NEXTA
1670NEXTB
1675CALL(8)
1676CALL(6,B7+2,0)
1679PRINT
1680PRINTH1;" KLINGONS DESTROYED"
1682LETT(6,1,B7+1)=T(6,1,B7+1)+H1
1685PRINT
1690LETH1=0
1695IFH2=0GOTO1706
```



```
1700PRINTH2;" HOLE CREATED"
1702LETT(6,2,B7+1)=T(6,2,B7+1)+H2
1705LETH2=0
1706IFH3=0GOTO1716
1707PRINTTAB(6);"CRACK CREATED"
1708LETT(6,4,B7+1)=T(6,4,B7+1)+H3
1709LETH3=0
1710PRINT
1716GOTO7001
1720GOSUB80
1725PRINTTAB(?);"TACTIC LIST"
1726PRINT
1727PRINT"1.GOTO BASE UNLESS LOW ENERGY"
1728PRINT"   WHEN DOCK AT NEAREST BASE."
1729PRINT
1730PRINT"2.GOTO BASE AND DESTROY ALL"
1731PRINT"   KLINGONS IN SCAN UNLESS LOW"
1732PRINT"   ENERGY WHEN DOCK AT NEAREST."
1733PRINT
1734PRINT"3. DESTROY ALL KLINGONS IN SCAN"
1735PRINT
1736PRINT"4.GOTO YOUR OTHER SHIP."
1737PRINT
1738PRINT"5. GO ON LAST COURSE TO NEXT"
1739PRINT"   SCAN AND DESTROY ANY "
1740PRINT"   KLINGONS SEEN THERE."
1799RETURN
1801CALL(6,B7+2,0)
1802PRINT
1803PRINT
1830PRINT"COORDINATES OF REPAIR POINT?"
1840GOSUB1315
1841LETM8=M6=0
1845PRINT"LOOKING FOR ASSISTANCE"
1849LETM6=M8=0
1850FORB=Y-4TOY+4
1855LETB2=MOD(B,64)
1860FORA=X-4TOX+4
1865LETA2=MOD(A,64)
1870CALL(5,T,A2,B2,1)
1875LETT1=INT(T/1024)
1880IF(T1<8)+(T1>11)GOTO1898
1885GOSUB5302
1890NEXTA
1895NEXTB
1900IF(M8>1)+(M6>0)GOTO 1938
1905PRINT
1910PRINT"ONLY 1 SHIP IN SCAN RANGE"
1915PRINT"-REPAIR IMPOSSIBLE."
1920PRINT
1925GOTO2045
1930IFM6<1GOTO1935
1931IFI8<>1 GOTO1935
1932GOTO5345
1935PRINT
1936PRINT"O.K! HELP IS AVAILABLE."
1940PRINTTAB(9);"SHIP X SHIP Y"
1945PRINT"ENERGY";TAB(9);E(0,B7);TAB(16);E(1,B7)
1950PRINT
1955PRINT"HOW MANY UNITS FOR REPAIR"
```

```
1956PRINT"(COST TO BE SHARED)      ";
1960INPUTM3
1965IFE(0,B7)-(M3/2-1)>0GOTO1975
1966PRINT"NOT AVAILABLE."
1970GOTO2035
1975IFE(1,B7)-(M3/2-1)>0GOTO1985
1980GOTO1966
1985LETE(0,B7)=E(0,B7)-M3/2
1990LETE(1,B7)=E(1,B7)-M3/2
1995PRINT
2000IFM3<400GOTO2030
2006CALL(5,T,M1,M2,1)
2007LETT1=INT (T/1024)
2008IF(T1<>4)*(T1<>5)GOTO2026
2010PRINT"-REPAIR COMPLETE."
2011LETT(5,4,B7+1)=T(5,4,B7+1)+1
2015LETT=0
2020CALL(5,T,M1,M2,2)
2025GOTO2040
2026PRINT"COORDINATES WRONG"
2027GOTO2035
2030PRINT"INSUFFICIENT ENERGY SUPPLIED"
2035PRINT"OPERATION UNSUCCESFUL."
2040PRINT
2041GOSUB260
2045CALL(8)
2050GOTO7001
2101CALL(6,B7+2,0)
2107PRINT"COST IS 400"
2108PRINT
2109PRINT"1. LONG RANGE SCAN"
2110PRINT"2. TRADE ROUTES"
2111PRINT"3. STARBASE ENERGIES"
2113 PRINT
2114PRINT
2115PRINT"TYPE NO. OF YOUR CHOICE ";
2116INPUTA9
2117ONA9GOTO2120,2142,2155
2118PRINT"NOT VALID"
2119GOTO2115
2120PRINT
2121PRINT"WHICH SCAN ?"
2122PRINT
2123PRINT"1. FREIGHTERS"
2124PRINT"2. SHIPS AND B/SES"
2125PRINT"3. KLINGONS"
2126PRINT"4. HOLES"
2127PRINT"5. CRACKS"
2128PRINT"6. ALL OBJECTS"
2129PRINT"7. INNER SPACE"
2130INPUTA9
2131ONA9GOTO2134,2134,2134,2134,2134,2134,2134
2132PRINT"NOT 1-7, RE-TYPE ";
2133GOTO2130
2134CALL(7,A9,B7+1)
2140GOTO2400
2142PRINTV7;"TRADE ROUTES BLOCKED"
2143PRINT"DUETOCRACKS."
2144LET A9=A9+6
2150GOTO2400
```



```
2155FORI=1TO4
2157LETT(I,4,B7+1)=T(I,3,B7+1)
2158PRINT"STARBASE "A$(I-1,I-1)" ";T(I,4,B7+1)
2159LETT(I,2,B7+1)=1
2160NEXTI
2161LET A9=A9+6
2166GOTO2400
2300IFC=1GOTO2320
2305LETC=1
2310CALL(6,(C+4)+(B7*6),0)
2315GOTO2107
2320LETC=0
2325CALL(6,(C+4)+(B7*6),0)
2330GOTO2107
2335IFC=1GOTO2355
2340LETC=1
2345CALL(6,(C+4)+(B7*6),0)
2350GOTO7001
2355LETC=0
2360CALL(1,0)
2365CALL(1,-3)
2370GOTO7040
2400LETE(C,B7)=E(C,B7)-400
2401PRINT
2402LET Z$(N(B7)+(B7*20)-1,N(B7)+(B7*20)-1)=NS(A9,A9)
2421CALL(8)
2423CALL(6,(C+4)+(B7*6),0)
2425GOTO7001
2625IF(A2<61)*(A2>2)GOTO2670
2635LETH3=H3+1
2640LETT=5120
2645FORB=0TO63
2650CALL(5,T,0,B,2)
2655NEXTB
2656LETV1=1
2657LETV7=V7+2
2660GOTO1665
2670IF(B2<61)*(B2>2)GOTO2715
2680LETH3=H3+1
2685LETT=5120
2690FORA=0TO63
2695CALL(5,T,A,0,2)
2700NEXTA
2701LETV2=1
2702LETV7=V7+4
2705GOTO1665
2715IF(A2<30)+(A2>34)GOTO2750
2720IF(B2<64)*(B2>17)GOTO2751
2725LETH3=H3+1
2730LETT=5120
2735FORB=0TO17
2740CALL(5,T,32,B,2)
2741NEXTB
2742LETV4=1
2743LETV7=V7+1
2745GOTO1665
2751IFB2<47GOTO2780
2755LETT=5120
2760FORB=47TO63
2765CALL(5,T,32,B,2)
```

```
2766NEXTB
2767LETV6=1
2768LETV7=V7+1
2770GOTO1665
2780IF(B2<30)+(B2>34)GOTO1635
2785IFA2>17GOTO2815
2790LETH3=H3+1
2795LETT=5120
2800FORA=0TO17
2805CALL(5,T,A,32,2)
2806NEXTA
2807LETV3=1
2808LETV7=V7+1
2810GOTO1665
2815IFA2<47GOTO1635
2820LETH3=H3+1
2825LETT=5120
2830FORA=47TO63
2835CALL(5,T,A,32,2)
2836NEXTA
2837LETV5=1
2838LETV7=V7+1
2840GOTO1665
2862LETL=L+1
2870LETJ3=B7
2875FORB7=0TO1
2877CALL(6,B7+2,0)
2880GOSUB80
2999PRINT"STARSHIP CONTROL"
3000PRINT"WANTS SOME ANSWERS"
3001PRINT"TO THE FOLLOWING-"
3002PRINT"INTERROGATION SESSION NUMBER ";L
3003LETI8=0
3007PRINT
3010PRINT"ANSWER USING 1 LINE UN"
3011PRINT"-LESS DIRECTED OTHERWISE."
3012PRINT"PRESS RETURN AT THE"
3013PRINT"END OF EACH LINE."
3014PRINT"IFYOU CAN'T ANSWER"
3015PRINT"TYPE NA (NOT APPLICABLE)"
3016GOSUB3305
3018NEXTB7
3020FORB7=0TO1
3025IFB7=1GOTO3048
3030LETG$="QUES"
3032IFL<10GOTO3042
3035LETG$(4,4)="1"
3037LETG$(5,5)=N$(L-10,L-10)
3040GOTO3046
3042LETG$(4,4)="0"
3045LETG$(5,5)=N$(L,L)
3046CALL(1,G$)
3047CALL(1,1,2)
3048FORI=1TO6
3049FORJ=1TO5
3050PRINTINT(T(I,J,B7+1));TAB(10*J)
3051NEXTJ
3052PRINT
3053NEXTI
3054LETJ=5
```



```
3055GOSUB4005
3056GOSUB4011
3057NEXTB7
3058FORJ=1TO8
3060FORB7=0TO1
3062LETH$="QFORMS"
3063CALL(1,H$)
3066CALL(6,B7+2,0)
3069IFM(L,J)<>18GOTO3075
3070FORI=1TO4
3071IFT(I,2,B7+1)=1GOTO3075
3072NEXTI
3073PRINT"QUESTION SKIPPED"
3074GOTO3291
3075LETA=INT(D(M(L,J))/10)
3076CALL(1,2,1)
3077IFA=0GOTO3082
3078FORI=1TOA
3079INPUTQ$
3080NEXTI
3082LETA1=INT (D((M(L,J))+1)/10)
3084FORI=1TO(A1-A)
3085LETQ$(1,31)="
3086INPUTQ$
3088PRINTQ$(1,31)
3089LETQ$(1,31)="
3090IFQ$(0,0)="O"GOTO3165
3092IFQ$(0,0)="X"GOTO3155
3095IFQ$(0,0)="Y"GOTO3150
3097IFQ$(0,0)="W"GOTO3145
3100IFQ$(0,0)="L"GOTO3140
3102IFQ$(0,0)="N"GOTO3125
3105IFQ$(0,0)="M"GOTO3110
3107GOTO3165
3110LETI2=1
3112IFT(I2,2,B7+1)=1GOTO3120
3115LETI2=I2+1
3116IFI2>7GOTO3165
3117GOTO3112
3120PRINTT(I2,4,B7+1)
3122GOTO3165
3125LETI2=1
3127IFT(I2,2,B7+1)=0GOTO3135
3130LETI2=I2+1
3131IFI2>7GOTO3165
3132GOTO3127
3135PRINTT(I2,3,B7+1)
3137GOTO3165
3140PRINTX$(4+(B7*9),4+(B7*9))
3142GOTO3165
3145PRINTX$(3+(B7*9),3+(B7*9))
3147GOTO3165
3150PRINTX$(2+(B7*9),2+(B7*9))
3152GOTO3165
3155PRINTX$(1+(B7*9),1+(B7*9))
3157GOTO3165
3165NEXTI
3166CALL(1,-2)
3167PRINT"RESPONSE(S) PLEASE."
3168LETA1=D((M(L,J)+1))-(A1*10)
```

```
3169FORI=1TOA1
3170IFA1=1GOTO3173
3171CALL(1,1,1)
3172PRINTAS(I-1,I-1);")";
3173CALL(1,1,2)
3174PRINT"QUESTION ";J;" PART ";I
3175CALL(1,1,1)
3187INPUTQ$
3190CALL(1,1,2)
3192PRINTQ$
3195CALL(1,1,1)
3197PRINT"HOW CONFIDENT (0-10) ";
3207INPUTQ$
3210CALL(1,1,2)
3211PRINTQ$
3212NEXTI
3213CALL(1,1,1)
3214FORI9=1TO4
3215PRINT
3216NEXTI9
3217NEXTB7
3218NEXTJ
3219CALL(1,-1)
3220CALL(1,1,1)
3222FORB7=0TO1
3224GOSUB3331
3226NEXTB7
3228LETB7=J3
3242RETURN
3245LETT(1,1,B7+1)=1
3246LET F9=1
3247LET F8=1
3255RETURN
3260LETT(2,1,B7+1)=1
3261LET F9=1
3262LET F8=2
3270RETURN
3275LETT(3,1,B7+1)=1
3276LET F9=1
3277LET F8=3
3285RETURN
3290LETT(4,1,B7+1)=1
3291LET F9=1
3292RETURN
3293GOTO3217
3300RETURN
3305GOTO3330
3307CALL(5,T,16,16,1)
3310LETT(1,3,B7+1)=(T-INT(T/1024)*1024)*10
3312CALL(5,T,48,16,1)
3315LETT(2,3,B7+1)=(T-INT(T/1024)*1024)*10
3317CALL(5,T,16,48,1)
3320LETT(3,3,B7+1)=(T-INT(T/1024)*1024)*10
3322CALL(5,T,48,48,1)
3325LETT(4,3,B7+1)=(T-INT(T/1024)*1024)*10
3330RETURN
3331FORI=1TO4
3332FORJ=1TO 2
3333LETT(I,J,B7+1)=0
3334NEXTJ
```



```
3336NEXTI
3337RETURN
3355LETN=200
3356LETB=0
3357LETM$="X"
3360CALL(13,M$,B)
3365LETN=N-1
3370IFN=0GOTO3395
3375IFB=0GOTO3360
3376IFN>198 THEN 3355
3380LETI$=M$
3385PRINT
3389CALL(6,B7+2,0)
3390GOTO191
3395LETI$(0,0)="M"
3400LETM$(0,0)="X"
3401PRINT
3402PRINT"SHIP ";ES(ABS(C-1),ABS(C-1));" DRIFTING"
3405IFC=1GOTO191
3407LETI$(0,0)="1"
3409GOTO191
3450LETF=4
3455LETE=B(C,B7)
3460GOTO585
4000 LET T=6444
4005FORI=1TO4
4010IFT(I,2,B7+1)=0GOTO4045
4015 CALL(5,T,A,B,2)
4016 LET A=16
4017 LET B=24
4018 CALL(5,T,A,B,2)
4020 LET A=1
4025LETX$((B7*9)+I+J-5,(B7*9)+I+J-5)=X$((B7*9)+4+I,(B7*9)+4+I)
4030 CALL(5,T,A,B,2)
4035 LET A=7
4040GOTO4070
4045LETJ=J-1
4050 LET A=53
4055LETX$((B7*9)+J,(B7*9)+J)=X$((B7*9)+I+4,(B7*9)+I+4)
4060 CALL (5,T,A,B,2)
4065 LET T=11240
4070NEXTI
4071PRINT
4072PRINT"COMMANDS"
4073PRINTK$(B7*20,(B7*20)+19)
4074LETK$(B7*20,(B7*20)+19)="
4075GOSUB6005
4076PRINT"CRACKS"
4077PRINTV1;V2;V3;V4;V5;V6;V7
4078PRINT
4079RETURN
4080 LET T=12264
4085 LET A=B=30
4090 CALL (5,T,A,B,2)
4095 RETURN
4104CALL(6,B7+2,0)
4105PRINT"SET TACTIC OR EXECUTE ?"
4110PRINT"TYPE S OR E ";
4120INPUTM$
4125IFM$(0,0)="E"GOTO4335
```

```
4380INPUTM$
4385GOSUB4165
4390IFI<10GOTO4405
4395PRINT"NOT VALID"
4400GOTO4370
4405IFP(1,I,C,B7+1)=IGOTO4415
4410GOTO4395
4415LETP2=I
4416LETP(4,P2,C,B7+1)=P(4,P2,C,B7+1)+I
44170NP2GOTO4430,4430,4631,4700,4855
4430GOSUB4435
4432GOTO4620
4435IFE(C,B7) < P(2,P2,C,B7+1)GOTO4440
4436LETC5=S(P(3,P2,C,B7+1))
4437LETC6=S(P(3,P2,C,B7+1)+1)
4438GOTO4505
4440LETD1=1
4441LETT3=(P(3,P2,C,B7+1)/2)+11
44451FX<32GOTO4480
4450IFY<32GOTO4465
4455LETC6=C5=47
4460GOTO4505
4465LETC5=47
4470LETC6=15
4475GOTO4505
4480IFY<32GOTO4500
4485LETC5=15
4490LETC6=47
4495GOTO4505
4500LETC6=C5=15
4505FORA=C5TOC5+2
4510FORB=C6TOC6+2
4515CALL(5,T,A,B,1)
45201FT=0GOTO4550
4525NEXTB
4530NEXTA
4535LETC5=C5-1
4540LETC6=C6-1
4545GOTO4505
4550CALL(5,T,X,Y,1)
4555CALL(5,0,X,Y,2)
4560CALL(5,T,A,B,2)
4565LETX=A
4570LETY=B
4580LETX(C,B7)=A
4585LETY(C,B7)=B
4605IFP2=2GOTO4615
4610GOSUB260
4615RETURN
4620IFP2=2GOTO4631
4625GOTO7001
4631GOSUB4635
4632GOTO7001
4635FORB=Y-4TOY+4
4640LETB2=MOD(B,64)
4645FORA=X-4TOX+4
4650LETA2=MOD(A,64)
4655CALL(5,T,A2,B2,1)
4660IFINT(T/1024)<>6GOTO4670
4665CALL(5,0,A2,B2,0)
```



```
4130IFM$="S"GOTO4141
4135PRINT"NOT VALID"
4136P  NT
4140GOTO4110
4141IFE(C,B7)>1500GOTO4145
4142PRINT"ENERGY TOO LOW"
4143GOTO7001
4145PRINT"COST IS 1000 UNITS"
4146PRINT"CHOOSE TACTIC FROM LIST"
4147LETE(C,B7)=E(C,B7)-1000
4148GOSUB1725
4150PRINT"TYPE NUMBER(1-9) ";
4155INPUTM$
4160GOSUB4165
4161GOTO4185
4165FORI=1TO9
4170IFM$(0,0)=N$(I,I)GOTO4180
4175NEXTI
4180RETURN
4185IFI<10GOTO4205
4190PRINT"NOT VALID"
4195GOTO4105
42051FI<3GOTO4210
4206LETP(1,I,C,B7+1)=I
4207GOTO7001
4210PRINT
4215PRINT"WHICH BASE.TYPE A,B,C OR D"
4220INPUTM$
4225GOSUB4235
4226GOTO4255
4235FORJ=5TO8
4240IFM$(0,0)=X$(J,J)GOTO4246
4245NEXTJ
4246LETJ=(J-4)*2
4250RETURN
4255IFJ<9GOTO4270
4260PRINT"NOT VALID"
4261GOTO4210
4270PRINT
4275PRINT"SPECIFY ENERGY LEVEL"
4280PRINT"FOR TERMINATION ";
4285INPUTA9
4295LETP(1,I,C,B7+1)=I
4300LETP(2,I,C,B7+1)=A9
4305LETP(3,I,C,B7+1)=J
4315GOTO7001
4335PRINT
4340PRINT"YOU'VE SPECIFIED THE"
4341LETP9=0
4345PRINT"FOLLOWING ";
4350FORK=1TO9
4355IFP(1,K,C,B7+1)<> KGOTO4365
4360PRINTN$(K,K)";",";
4361LETP9=1
4365NEXTK
4370PRINT
43711FP9=1GOTO4375
4372PRINT"NONE SPECIFIED"
4373GOTO7001
4375PRINT"WHICH ONE REQUIRED ";
```

```
4670NEXTA
4675NEXTB
4680GOSUB260
4685RETURN
4700PRINT"TACTIC";P2
4705IFC=1GOTO4730
4715LETC5=X(1,B7)
4720LETC6=Y(1,B7)
4725GOTO4736
4730LETC5=X(0,B7)
4735LETC6=Y(0,B7)
4736GOSUB4740
4737GOTO4840
4740FORA=C5-2TOC5+2
4745FORB=C6-2TOC6+2
4750CALL(5,T,MOD(A,64),MOD(B,64),1)
4755IFT=0GOTO4785
4760NEXTB
4765NEXTA
4770LETC5=C5-1
4775LETC6=C6-1
4780GOTO4740
4785CALL(5,T,X,Y,1)
4790CALL(5,0,X,Y,2)
4795CALL(5,T,MOD(A,64),MOD(B,64),2)
4800LETX=A
4805LETY=B
4810IFC=1GOTO4830
4815LETX(C,B7)=A
4820LETY(C,B7)=B
4825GOTO4836
4830LETX(C,B7)=A
4835LETY(C,B7)=B
4836RETURN
4840GOSUB260
4845GOTO7001
4855LETC5=X+(A(B(C)*2)*8)
4860LETC6=Y+(A((B(C)*2)+1)*8)
4865GOSUB4740
4870GOTO4631
4885LETT(5,5,B7+1)=T(5,5,B7+1)+E(4,B7)
4887LETE(4,B7)=0
4890IFK9<T(5,1,B7+1)GOTO4900
4895LETT(5,1,B7+1)=K9
4900LETK9=0
4905RETURN
4911PRINT"TACTICS"
4912PRINT
4915FORC7=0TO1
4920FORJ=1TO4
4925FORI=1TO6
4930PRINTP(J,I,C7,B7+1);TAB(10*I);
4935NEXTI
4940PRINT
4945NEXTJ
4950PRINT
4955PRINT
4960NEXTC7
4970PRINT
4975PRINT
```



```
4980RETURN
5001LETI8=1
5005PRINT
5010PRINT
5015PRINT"TYPE YOUR MESSAGE OR"
5020PRINT"QUESTION (UP TO 2 LINES)"
5025INPUTQ$
5030PRINT
5035IFB7=1GOTO5042
5040CALL(6,3,0)
5041GOTO5045
5042CALL(6,2,0)
5045PRINT
5050PRINT"INCOMING COMMUNICATION-"
5055PRINT
5060PRINTQ$
5065PRINT
5070PRINT"TYPE YOUR REPLY NOW"
5075PRINT"(KEEP IT SHORT- ONLY TWO LINES)"
5080PRINT
5085INPUTL$
5090PRINT
5095IFB7=1GOTO 5110
5100CALL(6,2,0)
5105GOTO5115
5110CALL(6,3,0)
5115PRINT"REPLY READS AS FOLLOWS:-"
5120PRINT
5125PRINT
5130PRINTL$
5140LETG$="COMM1"
5145LETH$="COMM2"
5150CALL(1,G$)
5155CALL(1,2,1)
5160INPUTI$
5170CALL(1,H$)
5175CALL(1,2,2)
5176IFI$="END"GOTO5195
5180PRINTI$
5185INPUTI$
5190GOTO5176
5195PRINT"CABIN ";N$(B7+1,B7+1);" SENDING.SESSION "J&+1
5200PRINTQ$
5205PRINT
5210PRINTL$
5215PRINT
5220PRINT
5225PRINTI$
5230CALL(1,-3)
5236CALL(1,H$)
5240INPUTI$
5250CALL(1,G$)
5251GOTO5255
5252INPUTI$
5255PRINTI$
5260IFI$="END"GOTO 5275
5270GOTO5252
5275CALL(1,-3)
5277CALL(1,1,1)
5280CALL(6,B7+2,0)
```

```
5285LETE(C,B7)=E(C,B7)-400
5290GOTO7001
5302LETM8=M8+1
5305IFB7=1GOTO5325
5310IFT1<10 GOTO5335
5315LETM6=M6+1
5320GOTO5335
5325IFT1>9GOTO5335
5330LETM6=M6+1
5335RETURN
5345CALL(5,T,M1,M2,1)
5350LETT1=INT(T/1024)
5355IFT1<>5GOTO1935
5360PRINT
5365PRINT"CRACK REPAIR POSSIBLE"
5370PRINT"HOW MUCH ENERGY FOR IT "
5375INPUTM3
5380IFE(C,B7)-(M3*1-1)>0GOTO5395
5385PRINT"NOT AVAILABLE"
5390GOTO5360
5395LETE(C,B7)=E(C,B7)-M3
5400PRINT
5405PRINT"CHECKING OTHER COMMANDER FOR"
5410PRINT"CO-OPERATION:PLEASE WAIT"
5415PRINT
5417IFB7=1 GOTO 5430
5420CALL(6,3,0)
5425GOTO5435
5430CALL(6,2,0)
5435PRINT
5440PRINT"OTHER COMMANDER REQUESTS"
5445PRINT"ENERGY FOR REPAIR ("M3")"
5450PRINT"-WILL YOU SUPPLY IT (Y OR N)";
5455INPUTB$
5460IFB$="N"GOTO5495
5465IFB$="Y"GOTO5480
5475GOTO5450
5480IFB7=0GOTO5500
5485IFE(0,1)-(M3-1)>500GOTO5515
5490IFE(1,1)-(M3-1)>500GOTO5525
5495GOTO5595
5500IFE(0,0)-(M3-1)>500GOTO5540
5505IFE(1,0)-(M3-1)>500GOTO5550
5510GOTO5495
5515LETE(0,1)=E(0,1)-M3
5520GOTO5535
5525LETE(1,1)=E(1,1)-M3
5535GOTO5565
5540LETE(0,0)=E(0,0)-M3
5545GOTO5565
5550LETE(1,0)=E(1,0)-M3
5565CALL(6,B7+2,0)
5570PRINT
5575PRINT"CO-OPERATION SECURED"
5580PRINT"-TRYING TO REPAIR"
5585IFM3>499GOTO5615
5590GOTO2030
5595CALL(6,B7+2,0)
5600PRINT"NO CO-OPERATION !"
5605GOTO2035
```



```
5615IFM3<500GOTO2030
5625PRINT"REPAIR IN PROGRESS"
5630 GOSUB5655
5635PRINT"OPERATION SUCESSFUL"
5636LET T(6,5,B7+1)=T(6,5,B7+1)+1
5640GOTO2040
5655IF(M1<61)*(M1>2)GOTO5705
5665FORB=0TO63
5670CALL(5,T,0,B,1)
5675IFT<>5120GOTO5685
5680CALL(5,0,0,B,2)
5685NEXTB
5690LETV1=0
5695LETV7=V7-2
5700RETURN
5705IF(M2<61)*(M2>2)GOTO5750
5710FORA=0TO63
5715CALL(5,T,A,0,1)
5720IFT<>5120GOTO5730
5725CALL(5,0,A,0,2)
5730NEXTA
5735LETV2=0
5740LETV7=V7-4
5745RETURN
5750IF(M1<30)+(M1>34)GOTO5845
5755IF(M2<64)*(M2>17)GOTO5800
5760FORB=0TO17
5765CALL(5,T,32,B,1)
5770IFT<>5120GOTO5780
5775CALL(5,0,32,B,2)
5780NEXTB
5785LETV4=0
5790GOTO5835
5800IFM2<47GOTO5845
5305FORB=47TO63
5810CALL(5,T,32,B,1)
5815IFT<>5120GOTO5825
5820CALL(5,0,32,B,2)
5825NEXTB
5830LETV6=0
5835 LET V7=V7-1
5840RETURN
5845IF(M2<30)+(M2>34)GOTO5840
5850IFM1>17GOTO5900
5855FORA=0TO17
5860CALL(5,T,A,32,2)
5865IFT<>5120GOTO5875
5870CALL(5,0,A,32,2)
5875NEXTA
5880LETV3=0
5890GOTO5835
5900IFM1<47GOTO5840
5905FORA=47TO63
5910CALL(5,T,A,32,1)
5915IFT<>5120GOTO5925
5920CALL(5,0,A,32,2)
5925NEXTA
5930LETV5=0
5935GOTO5835
5940LET A3=MOD(A2+32,64)
```

```
5945LET B3=MOD(B2+32,64)
5950FOR A4=A3TOA3+6
5955LET A4=MOD(A4,64)
5960FORB4=B3TOB3+6
5965LET B4=MOD(B4,64)
5970CALL(5,T,A4,B4,1)
5971IFT=0THEN5990
5975NEXTB4
5980NEXTA4
5985RETURN
5990LET T=6444
5995CALL(5,T,A4,B4,2)
6000RETURN
6005PRINTZ$(B7*20,(B7*20)+19)
6010LET Z$(B7*20,(B7*20)+19)=
6015  PRINT
6020RETURN
7001LETM$(0,0)=" "
7005 GOSUB 7200
7006FORI=0TO1
7007LETT(5+I,3,B7+1)=E(I,B7)
7008NEXTI
7010GOSUB7300
7012LETN1=N1+1
7015IFD1=1GOTO7046
7020IFN.<20GOTO7040
7026GOSUB2862
7027LETN1=0
7028LETN(0)=N(1)=0
7040GOSUB7355
7042GOTO179
7046CALL(6,B7+2,0)
7047GOSUB30
7052IFD1=2 THEN7020
7053PRINT"YOU HAVE";E(C,B7);"ENERGY AVAILABLE"
7054PRINT"HOW MUCH DO YOU WANTTOINVEST IN THIS STARBASE";
7055INPUTI9
7056IFI9<=E(C,B7)GOTO7059
7057PRINT"TOO MUCH"
7058GOTO7053
7059LETE(C,B7)=E(C,B7)-I9
7060LETT1=T3
7068LETT(T3-11,5,B7+1)=T(T3-11,5,B7+1)+I9
7069PRINTT(T3-11,5,B7+1);" =TOTAL INVESTED"
7071IFD1=2 THEN7020
7072LETD1=2
7073LETE(C,B7)=INT(T(T1-11,3,B7+1)/4+E(C,B7))
7074CALL(6,97+2,0)
7075GOSUB80
7080PRINT"DOCKED: SHIP REFUELLED."
7085PRINT
7086GOSUB197
7090PRINT
7091CALL(6,(C+4)+(B7*6),0)
7100GOTO7020
7105PRINT
7106CALL(6,B7+2,0)
7110IFE(3,B7)>500GOTO7125
7113LETE(0,B7)=500
7115GOSUB7251
```



```
7120RETURN
7125IFE(1,B7)>500GOTO7140
7130LETE(1,B7)=500
7135GOSUB7251
7140RETURN
7200 LET X5=X-16-INT((X-16)/32)*32
7205 LET Y5=Y-16-INT((Y-16)/32)*32
7206 LET Q5=0
7208 LET Q6=3
7210 LET X6=X5*(V6*(15<X)*(X<32)+V1*(47<X)=0)
7213  LET X7=X5*(V4*(15<X)*(X<32)+V1*(47<X)=0)
7215 LET X8*(32-X5)*(V1*(X<16)+V4*(31<X)*(X<48)=0)
7217 LET X9=(32-X5)*(V1*(X<16)+V6*(31<X)*(X<48)=0)
7220 LET Y6=Y5*(V5*(15<Y)*(Y<32)+V2*(47<Y)=0)
7222 LET Y7=(32-Y5)*(V2*(Y<16)+V5*(31<Y)*(Y<48)=0)
7225 LET Y8=(32-Y5)*(V2*(Y<16)+V3*(31<Y)*(Y<48)=0)
7227 LET Y9=Y5*(V3*(15<Y)*(Y<32)+V2*(47<Y)=0)
7230 LET Q1=(X6+Y6-Q5>=0)*(X6+Y6-Q5)*Q6
7232 LET Q2=(X7+Y7-Q5>=0)*(X7+Y7-Q5)*Q6
7235 LET Q3=(X8+Y8-Q5>=0)*(X8+Y8-Q5)*Q6
7237 LET Q4=(X9+Y9-Q5>=0)*(X9+Y9-Q5)*Q6
7240 CALL(11,Q1,Q2,Q3,Q4,C+2)
7245 RETURN
7251PRINT"WARNING-LOW ENERGY"
7252PRINT"CONDITION EXISTS"
7253LETT(5,2,B7+1)=T(5,2,B7+1)+1
7255PRINT
7260RETURN
7300FORI=1TO4
7301 IFT(I,3,1)<2000THEN7320
7305LET T(I,3,1)=T(I,3,2)=T(I,3,1)-INT(RND(0)*200)
7320NEXTI
7321LET T(F8,3,1)=T(F8,3,1)+(F9*1000)
7322LET F8=F9=0
7325RETURN
7355IFB7=1GOTO7410
7360LETC8=C
7365LETB7=1
7370LETC=C9
7375LETX=X(C,B7)
7377LETY=Y(C,B7)
7380GOTO7455
7410LETB7=0
7420LETC9=C
7430LETC=C8
7440LETX=X(C,B7)
7445LETY=Y(C,B7)
7455CALL(6,B7+2,0)
7460RETURN
7470CALL(6,(C+4)+(B7*6),0)
7475RETURN
8010LETN=1000
8015CALL(13,M$,B)
8020LETN=N-1
8025IFN=0GOTO8045
8030IFB=0GOTO8015
8035LETI$=M$
8036PRINT
8040GOTO191
8045LETI$(0,0)="X"
```

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8050CALL(8)
8051CALL(7,6)
8055GOTO190
9702LETX$(5,5)=X$(14,14)="A"
9704LETX$(6,6)=X$(15,15)="B"
9706LETX$(7,7)=X$(16,16)="C"
9708LETX$(8,8)=X$(17,17)="D"
9710LETL=0
9712FORI=0TO23
9714READJ(I)
9716NEXTI
9718DATA2,1,0,3,4,9,20,21
9720DATA0,3,5,10,12,13,14,22
9722FORI=0TO23
9724READJ
9726LETD(I)=D(I)*10+J
9728NEXTI
9730DATA1,5,6,11,13,14,15,17
9737LETT(4,3,B7+1)=20000
9740FORI=0TO9
9741READS(I)
9742NEXTI
9743GOTO145
9744DIMZ$(40)
9952DIMB$(1)
9953 DIM L$(72)
9954 DIM N(2)
9955 DIM K$(72)
9956 DIM F(2)
9957 DIM X(2,2)
9958 DIM Y(2,2)
9959 DIM H$(6)
9960 DIM S(15)
9961 DIM P(4,6,4,2)
9962 DIM B(2,2)
9963 DIM D(30)
9964 DIMX$(18)
9965DATA1,3,7,9,10,11,13,14
9966DATA0,7,8,11,13,14,15,16
9967DATA2,3,4,6,14,20,21,22
9968DATA2,4,5,9,13,14,20,22
9969DATA7,8,10,12,14,15,16,21
9970DATA6,8,9,11,14,16,17,18
9971DATA0,7,10,14,15,17,18,19
9972DATA1,2,4,11,14,16,18,19
9973DATA6,8,12,14,18,19,21,22
9974DATA0,2,5,7,14,18,19,20
9975DATA1,3,8,9,14,18,19,22
9976DATA4,6,11,13,14,16,18,19
9977DATA5,10,12,14,15,17,18,19
9978DATA0,2,4,6,8,12,14,16,18,20,31,37,44
9979DATA46,50,54,58,65,72,76,86,94,102,103
9980DATA0,1,1,1,1,2,1,1,2,1,5,2,3,2,1,3,1,1,1,1,1,1,1,1
9981DATA0,0,15,15,47,15,15,47,47,47
9982 DIM T(6,6,2)
9983 DIM M(16,8)
9987 DIM O$(72)
9989 DIM K(20)
9990 DIMG$(6)
9991 DIM A$(1)
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9992 DIM E$(2)
9993 DIM A(15)
9994 DIM I$(72)
9995 DIM N$(10)
9996 DIM C$(20)
9998 DIM A$(9)
9999DIME(5,2)
```